

PROGRESSIVE TEACHING

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AN INTERPRETATION FOR THE GUIDANCE
OF TEACHING IN THE PUBLIC SCHOOLS

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TO MY TEACHER

WILLIAM CHANDLER BAGLEY

PREFACE

For some years during which the writer has been engaged in the training of teachers, there has seemed to be a dearth of materials in textbook form which could be used to give students any rounded or complete view of the scientific foundations of the new teaching. It is true that considerable was available in scattered form. The philosophy might be gathered from several texts. The psychology was to be found in still other volumes, but very seldom in a form which might be regarded as psychology actually applied to the problems of teaching. Other material was so difficult of access that its use was hardly practicable for college classes. If any attempt were made to present the modern point of view, it became necessary to send students to the library to read many references in numerous texts and magazines, a plan not extremely suitable with limited library facilities.

Again the writer's own ideas of teaching had been revolutionized first by some years of study under such pioneer thinkers as Bagley, Kilpatrick, and Thorndike, and further by careful study and observation of new classroom procedure in experimental schools in different parts of the world. He found himself not entirely in accord with all that he saw. Nor did the theory advanced by some seem adequate as a foundation for method.

It was with all of these circumstances in mind that

the present book was written. In it an attempt has been made to present the accepted teachings which are governing the newer schoolroom practice and to formulate a theory which would be, to a certain extent, basic to progressive teaching in all of the particular forms in which it is proceeding experimentally.

The writer believes that the greatest hope for the improvement of public schools lies in giving the best possible training to an adequate supply of well chosen teachers. This book is offered with the hope that it may make some contribution in that direction by providing material to be used in training teachers to carry on in newer ways in public schools.

In the preparation of this book the author has become indebted to many for their help. He wishes to acknowledge the courtesy extended to him by teachers in many parts of the world, who have allowed him the privilege of visiting their classrooms, of talking with them, and learning from them. He wishes to take the opportunity to thank the teachers under whom he has studied, many of whose names recur again and again in these pages, for the wider life they have given him and for the light they have thrown on the educative process. He is particularly grateful to Prof. William H. Burton of the University of Chicago, Dean Paul Klapper and Prof. Egbert M. Turner, of the College of the City of New York, and Prof. W. C. Bagley, of Teachers College, Columbia University for reading this manuscript and giving invaluable guidance in its revision and reconstruction.

A. G. M.

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PROGRESSIVE TEACHING

CHAPTER I

CONVENTIONAL OR VITAL EDUCATION?

Current criticism of the educative process. Throughout the mass of criticism that is monthly showered upon the schools there seems to run a common element. Everywhere, framed in one concrete charge or another, comes the complaint that the work of the schools is not properly related to the life of the community. The business man says that the school product is irresponsible, lacks initiative and common sense, is unfitted rather than fitted by the school to take part in active business life. The artist maintains that the average individual is untrained to participate in or appreciate the art and music of the community. The scientist-inventor cries out against a lack of familiarity with common natural materials and processes. The moralist finds a lack of developed character, which alone can prevent the misuse of training and the turning of the results of science to selfish gain. The schools are being continually arraigned to meet the charge that education has become divorced from living.

As evidence that this criticism is not superficial it may be well to call to the witness stand some of those who are qualified to speak on the subject. The first to be chosen is our man of the world, "a manufacturer of steam pumps, who enjoys playing the cello, sailing a boat along the New England coast in summer, and passing the winter in California"; certainly, then, a man who knows

something of the world by first-hand acquaintance and who seems to know, in addition, something of "places clammy with routine and barred with efficiency tests, and stale with the taints of modern industrial competition and the conventions of the social ritual." Hear his indictment.¹

Instead of the schools in general being sources of social irrigation and refreshment, they have remained more or less fruitless in their respective communities; very interesting to look at, because filled with such wonderful potential, such gorgeous opportunity, but unfertilized and fruitless.

There are leaves, and much noise of leaves, but the leaves of the school tree are not for the healing of the nation. Why not? What is this sterilization, this deadly fungus, which attacks the plant and prevents it from pouring out young men and women of such incandescence of soul and intelligence of mind and heart that two generations would purify the earth?

Here is one man who sees in the schools something very far removed from the life and needs of society.

If, however, such a statement is more than mere rhetoric one will hope to find an occasional school man who entertains something of a similar feeling. The next witness to be called, therefore, is an English schoolmaster of exceptional insight. He has gone a step farther than most and has put in practice in his school methods of the nature of which many have been talking inactively for years. So unusual has been his success that he has set forth the story in three hundred pages of fascinating reading wherein we find the schoolmaster essentially agreeing with the manufacturer of pumps.²

¹ E. Yeoman, *Shackled Youth* (The Atlantic Monthly Press, 1921), p. 2.

² H. Caldwell Cook, *The Play Way* (Frederick A. Stokes Co.), pp. 343, 353, 356, and 349.

If the boys now facing you in school are to be educated for life, trained to cope with the difficulties and to realize the duties which will confront them in the modern world, then the system on which our schools are organized must in the first place be wrought in keeping with the social and economic conditions which obtain at the present time, and, further, both schoolmasters and their pupils must have an understanding, a very real and practical understanding, of the state of public affairs, if they are to act rightly as citizens.

The educational system has in fact not been evolving at all, it has been congealing. And now it has become clogged, stuck fast. The educational system has ceased to be educational. Consequently we cannot look for reform through minor adjustments. The suggested improvement of which we have heard do not go to the heart of the matter. We must have an upheaval.

We appeal to the overlearned schoolmasters of the public schools to consider that education must recognize a closer connection between the life and work of the little men at their desks and the life and work of their fathers in offices and behind counters, and in fields, factories, and workshops. . . . And when the course of your instruction has come to an end and your pupil goes out into the world, what can he make of the world? Nothing. The world makes him. He can do nothing against an all-surrounding influence. If you have given him an ideal course of education and he has profited by it, he may protest in words; but, if he is to live, he must eventually give way to deeds.

If school studies and life in the world of the present day cannot be made to overlap and intermingle that they may be considered truly consecutive, there must be something wrong.

The third critic to be cited is the "Mother" who speaks with words of true motherly zeal. As she writes to the "Schoolmaster" she aims to point out the educational superiority of the free life of her "Peter" to that of the children in a routine schoolroom of a great city.³

³ Anonymous, *A Mother's Letters to a Schoolmaster* (Alfred A. Knopf, 1922), pp. 6 and 9.

His [Peter's] mornings have been spent at the Zoo, at the museums, at the Aquarium, on the top of a bus riding about town, over on the Palisades hunting butterfly eggs, or at home building a railway bridge with his steel structural toys, or painting the scenery for a play which he and his friends are soon to give in public performance. It's a pleasant round for a little boy, and much more in keeping with his desires and interests than is anything in your school, and certainly much more instructive! . . .

Of course, upon that last point you will want to argue again with me, just as you did the other morning, when you would not be satisfied to let me take him home until he had shown you that he actually does know enough of your school subjects to pass a creditable examination for your Junior High School department . . . but at the door of your schoolhouse I must draw back,—and sadly, though you believe me to be antagonistic. For you have built but a poor temple to service to these free ideas, and your rites and rules mock at and deny the promise and high opportunity which the land's law itself so generously offers to children. You call what you have "the proudest of the democratic institutions of our country." I call it a travesty.

It may be a surprise to some to find that, together with the cry of these three, may be joined that of the professional educator,⁴ who says:

Very generally, the curriculum has consisted of the material found valuable in carrying on life activities in the best way, but it has been presented apart or separate from the uses which it serves in these life pursuits.

The school's problems were those of developing a small number of skills in interpreting symbols and expressing meanings by their use—reading, spelling, writing, number, drawing, music; memorizing the content of some textbooks as in geography, history, and science; and of conducting some manual activity to develop dexterity; and to aid in the understanding

⁴F. G. Bonser, *The Elementary School Curriculum* (Macmillan Co., 1921), pp. 1 and 2.

of some ideas and principles, as by work in laboratory, shop, and garden. Many of these elements, processes, and principles used in carrying on the real activities of life were included in the curriculum, but *without relationship to the activities themselves*. It was assumed that if this content were learned in an orderly sequence of steps in school the pupil himself would see the relationship of its respective parts to definite life situations and use these as needs called for them. But the results of a curriculum which so completely isolated the content and method of school experiences from out-of-school life have shown that this assumption is not adequately valid.

It is quite clear from these quotations, and they are but typical of many others, that their authors, all capable and informed individuals, are at one in voicing the criticism that the present-day schoolroom is an artificial arrangement. The testimony in each case is to the effect that the educative process is cumbered with traditional ways of doing things. All agree that the schooling which many children of to-day are receiving is mechanical, formal, and isolated from the real life of the great world for which it is part of its duty to prepare these children.

Few informed individuals would be likely to differ from the edict thus set forth. The professional critic, however, sees the matter in an entirely different light from that in which it is seen by the lay critic. The latter is inclined to be both surprised and alarmed. He realizes that there are wrongs to be righted and flutters about in rhetorical fashion, alternately satirizing and vilifying the schoolmaster. Such conduct is the fruit of ignorance. One who knows the history of the present-day public school will have little but praise and commendation for the public schools, admiration and sympathy for the schoolmaster. So far from being surprised to find the schools of to-day as they are, he will marvel

that they are not worse. So far from being alarmed and distressed, he will be encouraged and hopeful. He will see that the conditions in the school world are not due to the perversity of school men, but to the rigidity of circumstances beyond their control. He will realize that the very changes which he so passionately advocates are dear to the hearts of many of the teachers themselves.

Then might we hope to find that the energies so ardently directed against the schools would be used to better purpose. Instead of criticizing the schools, the reformers might do better to campaign in their behalf. Instead of telling the teacher of shortcomings she realizes better than he does, he might beseech the public to free the teacher's hands to carry out her desires. The schools of to-day suffer not so much from ignorance within as from inadequate support from the very public which is first to criticize. It is in the historic growth of public education, not in the perversity of the schoolmaster, that the seeds of the disorder may be found.

Historic causes of formal schooling. Modern institutionalized civilization has brought about an educational condition that is unnatural. The concentration of population in large cities, the consequent development of present-day institutions, the growth of industrialism and the division of labor have produced radical changes in modes of living. Society has responded to these changes by making the adjustment known as public education.

There are several facts to be noted concerning public education which go far to explain present educational conditions. The first of these is that public education is a modern movement. Although people have lived for countless years since the days of Adam, and children have been educated in one way or another all of that time, public education, in the sense in which we know

it to-day, did not develop until very recently. The reason for this is, of course, that the causes which brought about the movement did not previously co-exist because they are intimately connected with the growth of what are known as the modern nations.

The growth of public education is closely related to this development of modern nations. It is clear that free state supported education for all could not develop before a philosophic basis to support it was worked out. That theoretical foundation was found in the principle of democracy⁵ which in its pure form is characteristic of the modern state. But the presence of such democratic ideals would not alone be enough to provide for the modern system of public schools. The organization of the modern states was necessary for its administration. As these states sprang up and national life crystallized, there arose state systems of public schools. They came about in response to a recognized need for a loyal state-supporting population. In autocratic states, like Prussia, the schools became the means of building a thrifty government-supporting people, in democratic states the schools aimed to provide an enlightened group of patriotic voters. Thus the school was developed as a part of the national organization of modern states and like them is of rapid growth and recent origin.

This recent development of public education becomes extremely clear when the actual dates of the setting up

⁵ In Prussia it was, however, an outgrowth of the policy of the benevolent despots. After her defeat by Napoleon at Jena, under the inspiration of Fichte, Prussia turned to education as a means of reorganizing the nation. See S. P. Duggan, *A Student's Text-book in the History of Education* (D. Appleton & Co., 1927), p. 372.

of systems of public education⁶ are considered. The great education laws of France all fall well within the last hundred years. The Primary Education Law of 1833, enacted under the July Monarchy was the first to organize a national system of primary instruction in that country. The Law of 1850⁷ set up, for the first time, a single state system with a Minister of Public Instruction at its head and a Superior Council of Public Instruction from which he was to take advice and with which he divided supreme authority.⁸ It was not until 1882, however, that the first of the Ferry Laws abolished fees in the public primary schools.

In Prussia the administrative system in the provinces and counties was established by regulations issued in 1817 and 1825.⁹ It should be noted, however, that although these schools were in part supported by fees or taxes levied upon the county school association, nevertheless, every child in attendance was expected to pay a fee.¹⁰ It was not until the law of 1888 that fees in the primary schools were abolished.¹¹

The development of the present system of education in England was extremely slow.¹² "The education of his children continued to be the private concern of the parent up to and long after 1800." Movements toward general education in the beginning of the nineteenth century were entirely philanthropic so that up to the thirties¹³ "England had done nothing as a government in the direction of the establishment or support of any

⁶ By public education is here meant free, compulsory, state-supported education.

⁷ E. H. Reissner, *Nationalism and Education* (Macmillan Co., 1922), p. 55.

⁸ *Ibid.*, p. 71.

⁹ *Ibid.*, p. 130.

¹⁰ *Ibid.*, p. 134.

¹¹ *Ibid.*, p. 201.

¹² *Ibid.*, p. 230.

¹³ *Ibid.*, p. 242.

form of public elementary school." For the next forty years the government distributed parliamentary grants according to regulation until the Elementary Education Act of 1870 was passed. Even under this act, however, elementary education was not free. It was not until 1891 that an act was passed which provided that free education in government aided schools could be demanded by parents for their children.¹⁴ The Education Act of 1902 marked some advance but a satisfactory system has only since the war been outlined in England by the famous Fisher Act of 1918, which has not been completely enforced.¹⁵

While, toward the end of the eighteenth century, there was in the United States, especially in New England, an educational tradition, nevertheless, the states had not created any special administrative machinery for the supervision of education. It was not until 1812 that New York created the office of State Superintendent of Common Schools, but the office was discontinued in 1821.¹⁶ During the period from 1828-1861, however, most of the states had provided for some official head of public education throughout the state and the public schools had, in practically all the states, been made free.¹⁷ It may thus be seen, that while children have been educated through all human history, the particular mode of education which is used to-day is of recent and rapid origin.

These conditions of development have placed upon

¹⁴ E. H. Reisner, *Nationalism and Education* (Macmillan Co., 1922), p. 284.

¹⁵ S. P. Duggan, *A Student's Textbook in the History of Education* (D. Appleton & Co., 1927), p. 402.

¹⁶ Reisner, *op. cit.*, p. 381.

¹⁷ *Ibid.*, p. 398.

the educators of the last century a peculiar and a heavy burden. They were faced with the twofold problem of keeping pace with the alarmingly rapid growth of the movement and at the same time of securing financial support from a somewhat reluctant public. In the first place, education, which had been hitherto rather haphazard and for the chosen few, had to be provided for the total population in the short period, comparatively speaking, of one hundred years. The great problems of present-day education had to be worked out with extraordinary speed; educational legislation was originated, tested, and modified; systems of national and state organization were constructed; problems of organization and administration were wrestled with. Then followed the great task of providing trained teachers, and finally the initiation of the modern science of education. Is it any wonder that those who have had these matters in hand are only now able to take a breath from the arduous labors of construction, are only now able to regard the workings of the great machine they have created?

The problems of financing this great machine have been serious ones. To an Old World civilization, burdened with taxation, it could not have been anything but a difficult task to work out the principle of state support. Everywhere arose the problem of too much to do and too little money to do it with. With such hindrances as these to overcome what more could be expected of the educational men of the past century?

It may, then, be realized that the public schools should not be lightly criticized. That so much should be accomplished in so short a time is to be wondered at. The educators of the past generation have had great battles to fight. It is only to be hoped that such strides

will continue to be made; that the schools so nobly built in haste will be modified and developed with equal zeal in days to come.

The development of educational traditions. As educators set themselves to work under the very definite and limiting restrictions just referred to, they evolved various devices for meeting the situation. It would not be convenient to examine all the movements which were instituted or all the schemes devised to this end. There are, however, several which are typical and by an examination of these it will be possible to see the formalizing effects which followed as a direct result of the conditions just outlined.

As typical examples of the way in which makeshift schemes have conventionalized and mechanized the educative process mention may be made of (1) the New England traditional schooling, (2) the system of payment by results in England, and (3) the monitorial schools of Lancaster and Bell. As each of these cases is developed in the following pages, it may be seen how the limitations of educational zeal by necessary haste and poverty of resources introduced into school life certain stultifying and deadening characteristics.

1. *Early education in New England.* One of the earliest provisions for education made during the colonial period was the so-called "dame school." The rigors of pioneer life made it difficult for mothers of families to give any attention to the teaching of their children. As a result of this the children were sent to schools kept in kitchens, garrets, barns, or any other available space and presided over by a school dame, matron, or maiden lady, in such time as she could spare from her housework. Ignorant as such teachers necessarily were of either subject matter or method, the curriculum nar-

crowded itself to reading and writing, and the schoolroom became a mere aggregation of children.¹⁸

But the English Puritans who migrated to New England between 1628 and 1640 brought with them English institutions, including an established tradition of local schools. So it followed that similar schools were set up in New England towns.¹⁹ The curriculum of these schools was largely determined by the narrow religious conception of life entertained by the Puritans. Reading was considered necessary for all, in order that the Scripture might be read. Writing and sometimes arithmetic formed part of the school work. All phases of art, however, were avoided and the only science was that of the false natural history and demonology of beliefs and traditions preserved from the past. Thus the *New England Primer* and similar texts became the materials, and discipline the method of education. So was saddled on the schools at an early date a narrow curriculum consisting chiefly of the three R's,²⁰ the uncompromising and impoverished textbook, the methods of individual recitation, of memorization, and the rod.

2. "Payment by results" in England. The Revised Code of 1861 set up in England a system which is known as "payment by results."²¹ The essence of the system was that Parliamentary grants to elementary schools were to be distributed according to the number of children who successfully passed examinations of a standard set by the education department. For every

¹⁸ R. L. Finney, *The American Public School* (Macmillan Co., 1921), p. 9.

¹⁹ S. C. Parker, *A Textbook in the History of Modern Elementary Education* (Ginn & Co., 1912), p. 57.

²⁰ E. P. Cubberley, *Public Education in the United States* (Houghton Mifflin Co., 1919).

²¹ Reisner, *op. cit.*, p. 262.

child six years of age who passed the three examinations eight shillings were paid to the managers of the school; for a child's failure in one of these three tests one third of the total amount allowed for him was deducted.

The effect of such an arrangement upon the elementary school soon became clear. The curriculum was limited to reading, writing, and arithmetic, the subjects for which grants were paid, and method was largely determined by the necessity for excessive drill in these subjects. "The whole arrangement was ridiculously simple, and educational administration was reduced to a question of arithmetic. The child became a money-earning unit to be driven; the teacher a sort of foreman whose business it was to keep his gang hard at work."²² In addition to this the system instituted a series of child examinations, which persists in many sections up to the present.

3. *Lancastrian schools.* The distinguishing characteristic of the Lancastrian schools introduced into England toward the end of the eighteenth century was that a single teacher conducted a school, usually a very large one, through the medium of monitors chosen from the scholars themselves. In 1805 the Lancastrian method was introduced into New York,²³ and in 1819 Joseph Lancaster himself was in charge of the model Lancastrian school in Philadelphia.

A description of the work of a boy's school taught by Thomas Walter in the city of Philadelphia is given in the Annual Report of 1829.²⁴

²² *Ibid.*, p. 281. Quoted from Education Department Report, 1860-61 (England), p. 281.

²³ C. C. Ellis, "Lancastrian Schools in Philadelphia," *Juniata College Bulletin*, April, 1909, p. 1.

²⁴ *Ibid.*, p. 21.

After a short time thus occupied the scholars leave their seats and arrange themselves round the room, in classes, of not more than nine each, standing in semicircles for the purpose of reading. The lessons used by all except the eight higher classes are printed in large type, and pasted upon boards, which are hung on the wall; the upper classes read in books. The boys are classed according to their proficiency; the whole school being divided into twenty-three reading classes; and twice in a month at regular periods such changes are made as the progress of the pupil requires. . . . Each of these small divisions is committed to the care of a monitor, selected by the master, under whose superintendence the operations of all are conducted. When the reading has been conducted for a suitable time, the scholars return to their seats and the greater part commence ciphering. The younger boys who have not begun to learn arithmetic write upon slates in large hand from copies. There are twelve ciphering classes, each having a monitor. . . . While most of the scholars are engaged in arithmetic, or in writing on slates, a part, consisting of about twenty-four write in copy books.

An idea of the method used may be gained from the regulations adopted by the Society for the Free Instruction of Female Children in Philadelphia.²⁵

The first class is to be those who are learning their letters, they are to have a copy placed before them as *A* or *a* and their sand being smoothed by the monitor, they are to copy the letter; when that is handsomely made another is to be placed before them, and so on until the whole alphabet is learned; both capital and small letter, are now to be printed from memory which after they can readily do they are to pass into the second class. This class is to be further exercised in learning the alphabet by calling them up and pointing to the letters which are suspended before them—

The second class is to be taught to spell by printing in the sand. The Monitor is to spell the word as *ab*, etc.

²⁵C. C. Ellis, "Lancastrian Schools in Philadelphia," *Juniata College Bulletin*, April, 1909, p. 11.

One more report of the workings of these schools may, on account of its satiric sting, indicate some of the deficiencies of the monitorial system.²⁶

. . . schools where the young idea was to be developed in penmanship by scratching with sticks in a sand bath, and showing educational agility by quickly erasing the crow tracks; developed into arithmetic by the doleful simultaneous chant of the multiplication table in which neither school, monitor, nor master could detect one intelligible sound, developed into poetry and morals by howling in horrid groans certain doggerel ballads or Lancastrian hymns; schools where the baby of five was the all-sufficient teacher of the baby of four—

The only true argument ever advanced in its favor was its cheapness. It was cheap, very cheap! Sand and rattan were its chief outlay—

It is not difficult to see that the work of these schools was mechanical; that the subject matter of the curriculum was the inexorable three R's. The method was that of memorization, and order was maintained by rigid measures. Yet the Lancastrian system held sway for years in the schools of the most important cities of the country.

Results of this traditional educational development. The effect of the restricted development indicated by these three examples is clear. There remains to the schools of to-day a heritage from the past century, a heritage which is not all good and which still contains certain unfortunate characteristics incidental to the conditions under which the schools have developed.

To one who would understand public education it is extremely important to be able to recognize conditions and methods which are due to historic accident. Other-

²⁶ *Ibid.*, p. 81.

wise there is a danger that such conditions and methods may be regarded and cherished as the results of valuable experience. What, then, can be gathered from the previous accounts as to ways of doing things that are traditional rather than valuable? A consideration of the three examples of educational development with the question in mind will draw attention to (1) modern methods of institutionalized schooling; (2) disproportionate emphasis upon certain subjects in the curriculum, notably reading, writing, and arithmetic; (3) formalized methods of teaching; and (4) routine school management.

1. *Institutionalized schooling.* The Lancastrian schools described here show in an exaggerated form the result of the attempt to handle a large number of children with inadequate equipment, and an insufficient supply of trained and accomplished teachers. The school must be turned into an institution and so formalized that the great problem of the school man is less that of the teaching process and increasingly that of school administration. But although the conditions which brought this about have, in a large measure, passed away with more generous support of the schools, nevertheless public-school systems even to-day, especially in the large cities, are burdened by the cumbrous processes of school administration. In a large city high school in such a city as New York, teachers to-day complain that so arduous are the duties of keeping records and making reports that their clerical duties interfere with their professional ones; so frequent are the interruptions of the actual lesson period that artistic teaching is seriously hampered. In certain sections of the country administrative zeal secures school buildings which are elaborately equipped but staffed by teachers of indifferent training.

So in many ways the schools have become rigidly organized.

Even country villages and towns are burdened by mechanical organization. In many a rural village throughout the country one may enter a primary grade on the hottest day in June and find children sweltering over thumbed copies of winter texts, while the window sill is decorated with dandelions and flags better known and enjoyed in meadow or on river bank. But this institutionalized teaching, like institutionalized cooking, is carried on to the detriment of the product. The important thing to realize is that such schooling is traditional rather than natural and should not be valued or protected in and for itself but only to the degree which happens to be expedient.

2. *An impoverished curriculum.* a. The Tyranny of the Three R's. No tradition seems to be more firmly fastened upon the schools and upon the public than the idea, that the main object of the elementary schools is to teach the children reading, writing, and arithmetic. Even before their arrival in kindergarten many children are sedulously prepared to recite that unintelligible jumble, the alphabet, and to sound the spelling of their own names. These formulas are regarded as the open sesame to a liberal education. The school once entered, the teacher is expected to increase the jingles in number and complexity.

The idea which it is here intended to emphasize is that this public adoration of the three R's is not due to their actual primary importance in the educative process, but to the circumstances in the development of the curriculum of the elementary school. On every side circumstances have seemed to conspire to place unwarranted emphasis upon these elements of subject matter.

Early attempts at the end of the Middle Ages may be regarded, in a sense, as the forerunners of elementary education. These attempts, as a result of the philosophy of the time and the practical necessities which molded the schooling given, emphasized the branches under discussion. The religious movement of the Reformation made a necessity for reading the Bible the reason for teaching reading, while the pioneer life of the time called for figuring. It has already been pointed out that the Lancastrian system had a similar result, as had the system of payment by results in England. Thus history has placed the elementary-school curriculum under the dominance of the tool subjects.

The result of this unfortunate emphasis has been an impoverishment of the school curriculum. Even such subjects as geography and history were for a long time excluded from the school program. It is but recently that the arts are beginning to take the important place which belongs to them, while problems of health and character are only now coming into prominence. The burdening of school hours with excessive and wasteful drill on the so-called fundamental processes has been one of the causes which has brought about a poor nourishment of national culture.

No claim is here made that reading, writing, and arithmetic are not important. It is not even denied that they are of primary importance. One of the most prominent educators in the country has gone so far as to make the statement, however, that music might be considered as the most fundamental subject in the schools, and he would have many to support him in the educational world. The claim here made is that the monopoly of the curriculum which reading, writing, and arithmetic have held in the past is due, not to their fundamental

importance, but to the circumstances which governed the growth of the present curriculum.

b. Organization of School Life in Terms of Subject Matter. As a secondary outcome of the dominance which reading, writing, and arithmetic hold over the elementary school has followed the widespread system of organizing school work in terms of subject matter of the course of study. Such organization has come about as a result of the fact that the mind tends to arrange materials in logical order. It might be said that the intrinsic nature of subject matter is logical. Hence it has come about that the schools have been organized in logical fashion. So far all is well. An unfortunate condition arises, however, when an attempt is made to make this logical organization the order of procedure in presenting and teaching subject matter.

Such an organization in terms of subject matter is not essential to the teaching process, but is one of the traditions of school teaching which has become fastened upon it by scholarly minds, whose zeal for classification and organization of knowledge has carried them too far. Logical compendiums of facts are like valleys of dry bones into which must be breathed the breath of life. How can this come about except by the organization of school life in terms of life, in terms of human conduct?

c. Subject Matter Separated from Life. The result of such a subject-matter organization of school work is to separate the activities of the schoolroom from the practical affairs of everyday life. Consider, for instance, the impractical way in which the matter of temperature is presented in the ordinary geography textbook. For each separate country it is given a separate paragraph under some such remotely interesting category as *Cli-*

mate. In everyday life things are otherwise. A New Yorker contemplating a vacation trip to Bermuda would be interested to know that the average July temperature of Bermuda is 73.3 degrees. Again, one's whole attitude toward the Arctic is changed by reading Stefansson's statement²⁷ that the mercury drops lower in Montana than it ever falls at the North Pole; that hundreds of species of flowering plants flourish under the hot Arctic sun. Such things are of interest, but the isolated facts of temperature as sometimes presented in geography lessons have little value, and the study of the ordinary geography book usually leaves many erroneous impressions as to the actual relations of temperature to human activities.

3. *Formal methods of teaching.* Another characteristic of school life which is the direct result of the way in which the public schools have evolved is found in formalized methods of procedure. Such conditions of school life as those which have been previously described have had their obvious effect in overemphasis upon the use of textbooks, routine methods of recitation, and other formal ways of teaching.

a. *Misuse of Texts.* One of the characteristics of formal teaching is to be found in slavery to the textbook and its order and mode of presentation. The dominance of the subject-matter conception of schooling is evidently related to the use of textbooks containing logically organized materials of instruction. It has been considered necessary in the past to place in the hands of the many unskilled teachers who have had charge of the schools a digest of the materials and subject matter of the different grades of schooling. The textbook was, in other

²⁷ Vilhjalmur Stefansson, *The Friendly Arctic* (Macmillan Co., 1921), Ch. ii.

words, the most direct intermediary between the makers of the curriculum and the children in school.

Excessive reliance upon the textbook and upon its order and method is therefore but another of the traditions of school-keeping. Although the older conception still persists widely, nevertheless the modern teacher of ability usually regards the textbook not as a rigid guide but rather as a reference book.

b. Individual Recitation. The continued dependent use of textbooks is intimately connected with the method of individual recitation. The isolated private recitation of the lesson to the teacher, which was characteristic of early colonial schooling is of this individual type, but more than that is included in the term as here used. Reference is also intended to its direct descendant in methods widely current to-day. In many a classroom an individual child is called upon to recite his spelling or reading or history, while the remainder of the pupils, being familiar with the subject matter involved, sit by as passive listeners, sometimes critical, but seldom interested.

This type of teaching is not true to the nature of a social group, such as the schoolroom should contain. One individual pupil is occupying the attention of the teacher while the remainder of the class is inactive and hence unimproved. Such work tends to encourage such false modes of learning as rote memory and production without comprehension. It is but a further example of routine teaching.

c. Child Examinations. Such methods and circumstances could not but culminate in systematic examinations. This is not the place to enlarge upon that unnatural practice, the traditional examination. Its results in the misguidance of the teacher's energies, in building a false

conception of the aim of education, and in distorting method have meant untold hours of wasted human energy. The superiority of the present-day achievement test is as yet not widely recognized, and teachers still "examine" their charges nine times a year throughout the six years of the elementary school simply because that is the approved custom of the past.

4. *Routine methods of school management.* It is readily recognized that these historic ways of doing things are directly related to one another. The adoption of one part of the system naturally commits the teacher to another. Consequently the institutionalizing of school life and the mechanizing of materials and methods of teaching was necessarily associated with routine methods of school management. In order to conduct a schoolroom decently and in order it became necessary to form a series of "schoolroom habits." These habits sometimes took the form of *standing up straight and holding your book in position* in a way unknown to human kind outside the schoolroom, or of *marching two and two in perfect order without even a whisper* which is to be witnessed nowhere else but in the penitentiary.

It is not here intended to minimize the importance of schoolroom habits, *when those habits are the customary and necessary habits of social intercourse.* It is, however, intended to point out that many of the routine methods of school management are arranged to *enforce order* rather than to *develop orderliness.*

When a system of school organization is set up which is at variance with the natural life of children, it becomes necessary to compel children to conform to it. The friction of the educative process becomes one of the most serious problems of teaching. Consequently there arises a necessity for discipline, frequently exercising itself by

means of physical force. So the child learns to keep the law for fear of the consequences instead of keeping it by habitual moral response.

Thus, much of the formal routine of the ordinary schoolroom which at first glance seems to be the foundation of order, is another characteristic of the inherited system. Routine is undoubtedly necessary, but it need not be of the unnatural, artificial kind which is due rather to a recognized system of teaching than to the actual life needs of a group of children.

Recent scientific education. The existence of such traditional ways of teaching will help in realizing that the educator who advocates newer ways is no mere faddist. The public school system is a mushroom growth. For a generation efforts have been chiefly directed to the emergency needs of education. It is only within the last few decades that school men have been able to pause in their constructive efforts to look about them. Now they have begun to make inventories, to consider their verdict. For the first time are they able to attack the problem of education upon a scientific basis.

In summary it may be said that the scientific educator differs from the ordinary layman in several ways. An appreciation of the actual historic causes of the present situation enables him to realize that many of the present characteristics of school life, so far from being precedents, are accidental rather than essential to the educative process. He is not surprised to find that the schools are as they are, but rather recognizes that the situation is the result of direct and unavoidable historic causes. Furthermore, an understanding of the causes throws light upon the nature of the remedies. Changes and improvements should go on in a careful and scientific rather than in a haphazard way. The

true basis for the determination of educational procedure is not precedent. It should rather be found in the actual nature of the factors of the educative process, the child, the curriculum, and the teacher. It is hoped that the following pages may set forth a clear and accurate idea of those factors and indicate some of their relationships.

The differences between the traditional and the newer type of school are many and difficult of explanation. They may be symbolized, however, by the difference in the mere external appearance of the schoolroom of the past, and the new schoolroom, such as may be seen in a modern experimental school in large teacher-training centres, and even occasionally in progressive school systems.

Many of us are only too familiar with the old-fashioned schoolroom, a dark and dingy place, lighted by an insufficient number of windows, with plaster blackboards in a state of defacement and perhaps of disintegration. The stationary desks are carved and marked with innumerable initials and facetious designs, the fruits of hours of idleness. How well the writer remembers his own desk in the seventh-grade room which he attended, just such a room as has been here described. It was a desk scarred with numerous trails or tracks. Through these tracks leaden shot could be pushed by the hour, shot which had been dignified to the condition of "sheep" and half of which were transformed into "black sheep" by immersion in the inkwell. If an inconsiderate teacher saw fit to interfere with such serious business, the sheep were quickly removed to large subterranean holes dug in the lower part of the desk, to rest securely in their fold. There were also labors over a paste of chalk and ink, which was used to fill the somewhat numerous cavities in the desk top. So was one enabled to alternate

the duties of "shepherd" and "dentist." That school-room, with its unattractive, barren appearance is still in use to-day.

In contrast may be placed a third-grade room in one of our modern experimental schools. It is a bright and sunny room, for its whole side and rear walls are composed of window lights. These are hung with movable cloth curtains supported on poles by rings, so that any suitable degree of illumination may be obtained. The blackboards are of slate, and low enough for the children to reach them. The floors are of hard wood, possibly with a small rug or two. The woodwork is attractively varnished and good prints or the children's own paintings hang upon the walls. The seats are not fastened to the floor but may be moved from place to place as needed. Hanging near the window is a canary which does its own cheery part when the children sing together. An aquarium stands where the light shines through its green waters. Plants, ferns, and various greenery decorate the room. In the corner stands the piano, and the victrola occupies a convenient spot.

Here and there about the room may be seen a doll's house or two. They are poor looking things, indeed. The chimneys are askew and the windows are crooked. True enough—but the little fingers that formed them grew straighter and the muscles stronger. In another part of the room a table is ready set for the dolls' tea-party. The china on the table was decorated by the children, the doilies woven by them. Near by is the sand-table, and what is this upon it? Surely none less than Robinson Crusoe himself. Here visibly before us is the log house constructed of small pieces of wood. If we look closely, we may even see the footprints of the man Friday! On a separate table, or shelf, lie the supplemen-

tary readers, always ready to beguile an idle moment with tales of "Jack the Giant Killer" illuminated by Jessie Wilcox Smith, or "Robin Hood" illustrated by Wyeth.

Between these two types of schoolroom there is a world of difference. One is barren and uninteresting, the other alive and happy. One is traditional and accidental in its origin, the other is based on the idea that the best preparation of living is right living.

That belief is the underlying theme of modern teaching. Such a conception of schooling as right and natural living has a direct and important bearing upon the educative process. Should such a belief be true, many traditional ways of school-keeping should be modified. If such modifications are to be made many problems arise as to how they shall be conceived and carried out. What, for instance, is the bearing of such a conception on the function of the teacher? How does it determine the activities of the child in school? How may it conform with established principles of good teaching? What modifications will it demand in customary method? Such questions, and many others immediately arise. Some attempt will here be made to discuss them. The following chapters, then, attempt to present a scientific view of the factors of the educative process, first of the child, then of the environment, and of the teacher. Further reference will be made to methods of relating these factors and to certain other significant matters.

PROBLEMS FOR CLASS DISCUSSION

1. Report to the class any verbal or written criticisms of schools which you have heard or read recently. To what extent were they justified?
2. Think of any teaching you received in elementary school,

and indicate any aspects of it which seem to you to have been largely traditional.

3. Describe the appearance of any modern elementary-school classroom which you have visited. What did you see that you would not have seen in an old-fashioned school?

4. If you had been born in the same social and financial circumstances a hundred years ago what elementary education would you have probably received? Secondary? College? A thousand years ago? Three thousand years ago?

OUT-OF-CLASS ACTIVITIES

1. Visit a modern elementary-school classroom. Take notes on appearance, equipment, activities of the children, activities of the teacher.

2. Ask your parents or grandparents to tell you in detail of their elementary schooling. Their secondary schooling. Their college training. Make a written account of what they tell you. It may be useful as a record.

3. Read the article "The American Elementary School" by W. H. Kilpatrick, in the *Teachers College Record*, March, 1929 and compare the point of view set forth with that of the present chapter.

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CHAPTER II

THE CHILD AS AN EDUCABLE ORGANISM

The primary factor in the educative process is the child. This is not a sentimental statement, but a logical one. Education does not exist for the teacher, or for the curriculum, but for the child. Neglect of this fundamental principle has frequently occurred in the past. Many educational errors have been due to the fact that the curriculum was wrongly taken as the starting point in practical education. A formal predetermined curriculum was arranged and to it the child was conformed. There followed various wrong conceptions of the child. In early colonial days, for instance, children were not only regarded as untrained, but they were also considered to be depraved, "steeped in sin and guilt, the heirs of hell." In the France of Louis XIV children were thought of as miniature adults and were taught to mimic their elders in all the curious and unnatural ways of the court. The present-day scientific attitude toward teaching indicates, on the other hand, that any sound conception of education must be based on knowledge of the child.

Scientifically the child must be considered as an organism. This is not, however, the popular conception. The attitude of the general public toward children is often colored by a severe distrust or a soft sentimentality. These two extremes are illustrated respectively by the severe home discipline of fifty years ago and the false

picturization of angel children on the screen to-day. A true conception of child nature depends not upon social attitudes but upon accurate knowledge. The child is not to be regarded as a pathological or abnormal adult, or as a sainted and unstained pilgrim from another world, but as an organism with scientifically observable characteristics and tendencies to right and wrong. The tendencies which are put to a use which meets with social approval will be considered right, while those which are put to a use which is disapproved will be considered wrong.

Since a knowledge of the nature of this organism must govern any attempt at enlightened teaching, it is profitable to consider just what science has to teach in the matter. Recent studies in biology and psychology have thrown much light on the subject. In order to outline their contributions a brief, clear presentation of the structure of the nervous system is necessary.

The structure of the nervous system.¹ All changes in the individual with which education is concerned, except those purely physical ones, such as nutrition, sanitation, and health, are effected in and through the nervous system. For practical purposes this nervous system may be considered under two heads, the actual structure known as the *connection system* and the connections between the parts of this structure, the *synapses*. For the practical purposes of this discussion it may be said that changes in the individual take place *by means of the connection system in the synapses* much as telephone messages cause changes in the human mind *by means of the wires but in the individual telephoning*.

¹The text should be read with reference to the diagrams, for it is otherwise incomplete.

These two parts² of the nervous system will here be considered separately in order.

The connection system. There is far more actual knowledge of the connection system than of the synapses. Much of this knowledge is the result of actual study

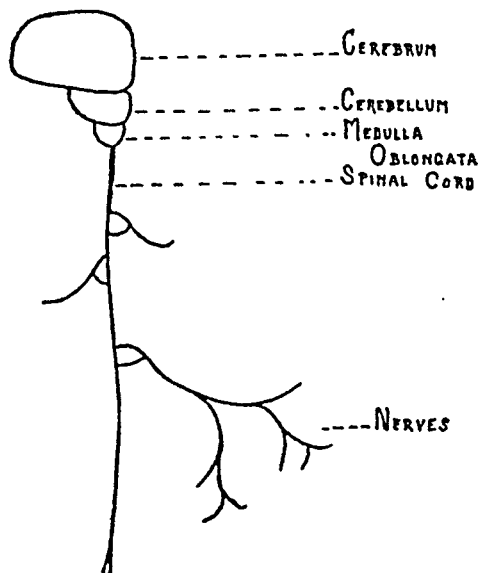


DIAGRAM SHOWING PARTS OF NERVOUS SYSTEM.

of the tissues by dissection and other neurological or biological methods. Such investigations have shown that the total connection system may be divided for purposes of convenient study into five parts, the nerves, the spinal column, the medulla oblongata, the cerebellum, and the cerebrum. Each of these parts, which may be observed

² It is recognized that this distinction is arbitrary. It is made for convenience in exposition. Categories are largely subjective and without exact counterpart in nature.

in the accompanying diagram, will be considered separately.

1. *The function of the nerves.* The nerves are the parts of the connection system which carry impulses from any point of stimulation inward to the spinal column or from the spinal column outward to some part of a responding organ. Their beginning points, or points of stimulation, are differentiated tissues which are affected by some special stimulus. The rods and cones in the retina of the eye, for example, are specialized nerve beginnings which are affected by light. The ending points, or points of response are differentiated tissues which effect some response. The endings of the motor nerve cells in the muscles are specialized nerve endings which effect muscular movements.

So infinitely complex is this system of nerves that a nerve impulse may be carried in through the spinal column to the higher brain centers from any point in the human body which is sensitive to a stimulus; or a nerve impulse may be carried out from the higher brain centers through the spinal column to any point in the human body which is capable of making a response. Thus there is a complete system of connections from any sensitive point in the human body via the spinal column to any other point of possible response.

It seems improbable, however, that any nerve impulse can find its way from any stimulated beginning point to any responding end point directly, that is to say without passing via the spinal column. Thus it would seem that the nerves themselves are purely a system of connection and in them resides none of the phenomenon known as intelligence.

2. *The function of the spinal column.* Much as one is tempted to hope, for the sake of logical organization,

that the spinal cord has some clearly differentiated function, that does not seem to be so. The cord seems to share with the medulla the ability to direct an incoming nervous impulse outward to an organ of response. The type of response which may be thus effected, however, is of a very simple and definite kind known as a reflex, that is, a response like the sneeze or knee-jerk which is made directly to a stimulus without the guidance of consciousness or volition. The particular reflex centers in the spinal cord are those for the limbs and part of the trunk.

3. *The function of medulla oblongata.* The medulla oblongata, or brain stem, seems to be functionally, as it is structurally, an extension of the spinal cord. This shared function may be better understood by considering the responses made by a frog from which the cerebrum and the cerebellum have been removed by a simple operation. Whatever responses are made by such an organism must be controlled by the medulla and cord. If such a frog be suspended from a wire, it hangs inert, but will react instantly to simple stimuli. A touch of the toe of the fore or hind leg causes immediate withdrawal. A burn is rubbed vigorously by the nearest leg. If strong acid is applied to the skin, rapid and convulsive movements of the leg are made, as if to brush off the irritant. A succession of electric shocks produces rigor of the muscles. Movements of this nature are called reflexes.

The medulla contains the reflex centers for the head and also for part of the interior of the trunk, including the heart and lungs. It is the central controlling agent of such acts as the eye wink and those which are concerned in chewing, deglutition, vomiting, sneezing, and coughing. In addition to these it controls three very

important automatic centers, that which regulates the activity of the heart, that controlling breathing, and that determining the caliber of the blood vessels. The spinal cord and the medulla oblongata are thus organs of *conduction* and of *reflex automatic action* only, and, therefore, not centers of the higher mental processes.

4. *The function of the cerebellum.* Consideration of the little that is known of the cerebellum leads to the opinion that it is concerned with the *coördination* of muscular movements. The fact that it is proportionately smaller in birds and fishes than it is in apes and men seems to indicate that it is related to the locomotor powers. The actions of pigeons from which the cerebrum has been removed are vividly described by Schrader.²

The hemisphereless animal moves in a world of bodies which . . . are all of equal value for him. . . . He is, to use Goltz's apt expression, *impersonal*. . . . Every object is for him only a space-occupying mass, he turns out of his path for an ordinary pigeon no otherwise than for a stone. He may try to climb over both. All authors agree that they never found any difference, whether it was an inanimate body, a cat, a dog, or a bird of prey which came in their pigeon's way. The creature knows neither friends nor enemies. In the thickest company it lives like a hermit. The languishing cooing of the male awakens no more impression than the rattling of peas, or the call-whistle, which in the day before the injury used to make the birds hasten to be fed.

Thus the use of the cerebellum seems to be entirely motor. It certainly has nothing to do with conscious perception. Consequently it may be assumed that it is not intimately concerned with intelligence.

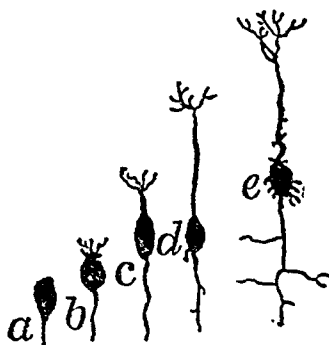
5. *The function of the cerebrum.* The remaining higher processes of the mind take place in the cerebrum, the

²Quoted by William James in *Psychology* (Henry Holt & Co., 1915), p. 97.

largest part of the central nervous system. Its gray outside surface is called the cortex. Below the cortex lies the white matter of the cerebrum.

The "thin, grayish, shirred rind, half a square yard in extent," called the cortex, has long been regarded as the seat of human intelligence. It is a structure of marvellous complexity: a switchboard for the countless impulses which pass hither and thither throughout the organism. It connects directly and indirectly with every other part of the nervous system. Therefore, the cortex has been called a projection surface on which every muscle and sensitive point in the whole body is represented.

The structure of the nervous tissue. Before going on to consider the synapse, it is necessary to indicate the

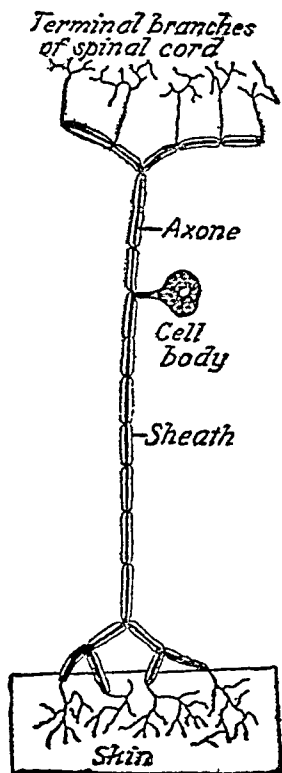


NEURONES IN DIFFERENT STAGES OF DEVELOPMENT.

In *a*, the elementary cell body alone is present; in *c*, a dendrite is shown projecting upward and an axone downward. (After Donaldson.)

nature of the tissue of which the connection system is composed. From the spinal cord spring thirty-one pairs of nerves, each of which may be thought of as a cable

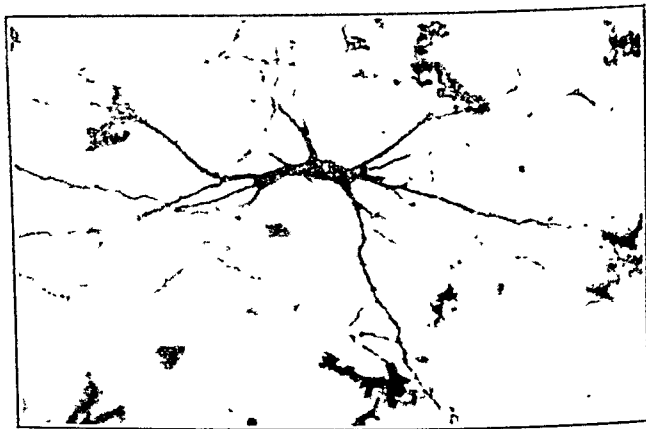
composed of thousands of fibers. These fibers either carry impulses outward from the spinal cord or inward, but no fiber carries both outward and inward impulses.



A REPRESENTATION OF A SENSORY NEURONE.

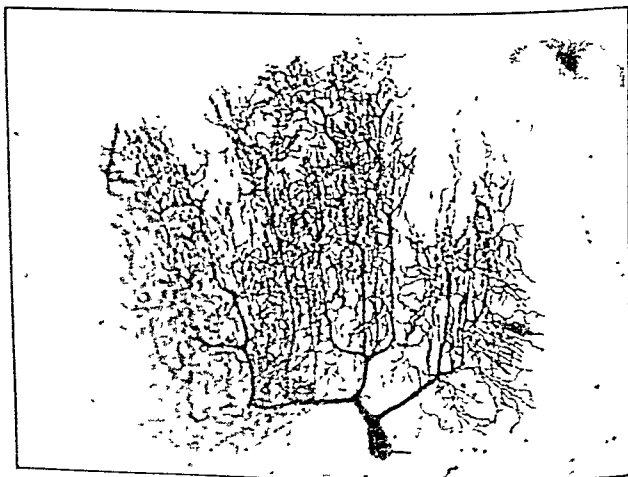
When a nerve seems to branch it does not really branch; its fibers are parted. These fibers together with all the remainder of the connection system are composed of cells.

One may think of this nerve and brain tissue as being



A PHOTOGRAPH OF A CELL-BODY OF A MOTOR NEURONE IN THE SPINAL CORD WITH NUMEROUS DENDRITIC PROCESSES AND THE BEGINNING OF THE NEURAXON. THE LATTER PASSES FROM THE CELL-BODY AT THE LEFT-HAND SIDE AND RUNS ALMOST HORIZONTALLY TO THE EDGE OF THE FIGURE.

After Starr, 21, Plate 3. $\times 120$ Diameters.



A PHOTOGRAPH OF A PURKINJE CELL.

After Starr, 35, Plate 15. $\times 125$ Diameters. From E. L. Thorndike, *Elements of Psychology* (A. G. Seiler, 1917).

composed of the essential nerve cells, called *neurones*, and of a supporting framework of tissue with which we are not directly concerned. The neurones themselves are the real conductile elements. They have been called the building stones of the nervous system. For practical purposes, therefore, the connection system, brain, spinal cord, and nerves may be thought of as an arrangement of neurone chains of infinite and miraculous complexity.

As neurones are specialized cells they have, in addition to the usual biological characteristics of cells, certain adaptations of structure which should be noted.

A better conception of a neurone can be obtained from the above figures than from a verbal description. Every neurone is composed of a cell body and several thread-like processes. The cell body may be round, oval, stellate, pyramidal or pear-shaped, of a diameter varying from 10 to 150 microns. (A micron is a thousandth part of a millimeter.) Its cytoplasm has a faint granular appearance, contains a conspicuous nucleus and nucleolus and certain dark irregular bodies or granules. Two names are used in referring to the thread-like processes. the *dendrites* (Greek: *dendron*, a tree) are short, many-branched offshoots, close to the cell body. *Axones* are long and comparatively straight. Particular attention should be called to the branched endings of these processes.⁴

The synapse. The actual, observed knowledge of the synapse is somewhat less than that of the connection system. In considering its nature it is the more necessary to fall back upon theory. It may be said with a

⁴For further diagrams, see E. L. Thorndike, *Educational Psychology* (Teachers College, Columbia University, 1913), Vol. I, Ch. xiv. See also R. S. Woodworth, *Psychology* (Henry Holt & Co., 1921), Ch. ii.

fair degree of safety, however, that synapses are the places of connection between the neurone cells. It is very difficult to describe these places of functional contact for little is known of their actual physiological structure. The essential truth is, that the complex chains of neurone cells which compose the connective tissue are not functionally continuous. There is some disagreement as to whether or not the end processes of the neurones, the axones and dendrites, come into actual physiological contact. At any rate, if there is any such contact there must be some surface of separation. Consequently it may be well to assume theoretically that *the ends of the neurone cells do not touch*. Whatever be the nature of the connection between them the place where the connection is made, be it point, tissue, area, or whatever it may be, is called the synapse.

Although little is known as to the actual physiological nature of the synapse there are theoretical assumptions as to its modes of behavior. It is supposed that it offers varying degrees of resistance to the neural currents. It is further thought that the synapse is itself modified by the passage of the nervous impulse. The first of these characteristics of the synapse is referred to as *permeability*, the second as *modifiability*. If the educability of the organism be considered to reside in the synapse, then the process of education must be determined by these two characteristics of permeability and modifiability of the synapses.

The nature of the nervous impulse. Before considering these two characteristics of permeability and modifiability attention may be directed to the nature of the nervous impulse. Concerning its actual nature little is really known. All that can be said is that it is a manifestation of life. Essentially it is a form of *energy*. In this respect

it is similar to the natural forces of gravity and electricity. Since its nature is not known; it can only be defined in terms of its effects.

There have been some attempts to identify the nervous impulse with the electric current. Although evidence has been obtained which might support such a theory it seems likely that, rather than being an indication of identity, this evidence may point to a basic similarity between the two forms of energy. Older scientific or popular conceptions have regarded the nerves as conduits which carry fluid pulses, or as cords to be pulled upon, such as those which govern the antics of marionettes. Such false conceptions have been responsible for misleading expressions as "nerve strain" or "nerve tension." As a matter of fact, the nerve impulse is not appreciably exhausting to the fibers concerned in forwarding it, as nerves themselves seem practically proof against fatigue.

Another widespread misconception with respect to the nervous current indicated by the phrase "as quick as thought" is that no time is consumed in its passage. This is obviously false; in fact the velocity at which the impulse passes along the nerve has been quite accurately measured. The rate of transmission in the nerve of a frog at room temperature has been calculated to be about 100 feet a second, that is to say, about the speed of an express train travelling seventy miles an hour.

Concepts basic to an understanding of the functioning of the nervous system. In order to think clearly concerning the nature of the nervous act it may be well to isolate theoretically three concepts. If one has a clear picture of the nervous system from cortex to nerve endings as being essentially chains upon chains of neurones, infinitely related to one another, the three following con-

cepts should make discussion simpler. The first is that of the nervous impulse as a *form of energy*, the second is that of the chains of neurone cells as *connections* which bear the nervous impulses, the third is that of the synapses as *variable bridges* between the parts of the connection system. While such clear-cut conceptions may not be certainly and absolutely correct the clarity so obtained may warrant the theoretical assumptions.

Permeability of the synapse. It has been pointed out that *permeability* is one of the characteristics of the synapse. Permeability is that quality of the synapse in virtue of which the nervous impulse may pass across it from neurone to neurone. It may be considered as existing in various degrees according to the ease of conduction of an impulse passing between neurones. Thus permeability is a variable quality which determines the passage of a given pulse of energy across the synapse. It may, then, be readily realized that thus the movement of currents in and about the neurone chains may be governed by conditions at the synapse.

Several conditions have been suggested as being possible determinants of permeability. In the first place, the actual spatial distance between the ends of neurone cells may have something to do with the ease of conduction across the synapse. Whether this be so or not, there may be some special condition of resistance. This might be considered as analogous to the resistance of different types of metal to the electric current. It seems likely that some such condition exists and that it is related to chemical action in the synapse.

Furthermore, the permeability of a given synapse may vary from time to time. Thus certain coöperating conditions in the whole organism may be such that at a given moment a current may pass where it would not

have passed an hour before and vice versa. Thus, consequently, certain conditions in the synapse and in the whole organism may govern nervous action in infinitely variable ways. The nerve impulse may take any one of a thousand paths according to the temporary and permanent variations at ten thousand synapses.

Modifiability of the synapse. The second characteristic of the synapse already mentioned is that of modifiability. Modifiability is that quality of the synapse whereby it is possible for changes to take place in permeability. It is conceivable that the organism might be so constructed that the permeability at the various synapses would be a constant and unchanging property. Thus would a machine be constructed so that every connection would be permanent and the machine would work in a definite and reliable way. The nervous system is much more complex. At every place of functional contact temporary and relatively permanent changes may take place.

A child may be considered as having at birth certain inherited permeability at the various synapses throughout his nervous system. If the permeability did not change the child would remain immature. As time passes, however, certain reactions with his environment produce alterations of permeability. The condition of hunger produces a certain temporary increased permeability at the synapses concerned with eating and swallowing. When the child has eaten his dinner, the permeability at these same synapses is decreased so that the eating and swallowing movements do not take place. We say that the hunger has been satisfied. This is an example of temporary change at the synapses. As the child grows older he acquires certain habits of speech, such as the saying of "papa" and "mama." The permea-

bility of the synapses in the neurone chains involved in speech has thus been altered since birth and is more or less permanently changed for life. This is an example of relatively permanent changes at the synapses. There are also certain permanent changes due not to environment but to inherited changes of growth and development, such as those concerned with the development of delayed instincts or those which mature after birth.

It will be readily realized that the educability of the organism depends upon this property of modifiability of the synapse. Were the synapses not modifiable by environmental conditions the human body would be an unalterable machine, like a watch or an electric car. Since this quality does exist, however, it makes possible an infinite variety of changes in the human body and hence in human conduct. Herein, then, lies the possibility of education. Education is a matter of producing changes in the permeability of the synapses. The infinite possibilities and opportunities of the educative process are dependent on that vital phenomenon, the modifiability of the synapse.

Summary of the relations of the nervous system to education. The presentation of the actual structure of the nervous system has been made in order that the relations between it and the process of education may be made as clear as possible. Consequently a summary of those relationships may not be out of place here.

With the nerves the teacher is not particularly concerned. Their chief function from the standpoint of training is that of a series of connections with the higher centers. Modifications made in synapses of the nervous system are in all probability governed by the higher centers.

The spinal column and the medulla oblongata, in ad-

dition to their function as connections, are concerned with the various reflexes. Such reflexes as the eyewink and the automatic movements of the heart are practically unmodifiable, as the needs of the organism demand. Even though some of them may be modified by determined training such changes would be beyond the interests or work of the teacher and do not warrant particular consideration here.

The responses governed by the cerebellum, although in all likelihood more easily modified than the pure reflexes, are not of particular importance to the ordinary school teacher. The coördination of muscular movements, particularly of the large motor type, has little to do with the work of the ordinary schoolroom and is probably largely determined in the preschool age. It may prove somewhat more interesting to kindergarten or physical-training teachers, and may even have its importance in the development of such fine motor movements as those involved in penmanship. Even such movements, however, are largely governed by the higher brain centers.

A consideration of the higher brain, the cerebrum, is more important. Little is definitely known as to the white matter of the higher brain so that it will be necessary to give special attention to the cortex, or outer shell of the higher brain. The cortex has been long recognized as the physiological seat of the human intelligence. Here reside the governing powers of mind and body which control and modify the lower nervous centers. In the cortex every other part of the nervous system is represented so that changes in the cortex, in a certain sense, are those which govern human conduct. Thus have the cortical tissues an especial significance, thus do they warrant, more than any other part of the organism, the special attention of the teacher.

It remains to make a brief reference to the essentials of the nervous tissue, the neurones, and the synapses. While it might be reasonable to expect that these two elements would participate equally in the *modification* of the nervous impulse a theoretical distinction is here made. It is supposed that the function of the neurone is *conduction* of the nervous impulse while that of the synapse is *modification*. Whether or not this be actually true is not certainly known. Even should it prove otherwise the symbolism involved is not likely to be misleading in the principles here worked out. The two functions of conduction and modification certainly exist, even though they may not be so clearly differentiated physiologically. No further reference will be made to this theory but it will be hereafter assumed that neurones are concerned with conduction and synapses with modification of the nervous current.

It may thus be seen that educating a child is educating his nervous system. Furthermore it may be realized that educating a child seems to be the modifying of the permeability of the synapses in his cortex. There are many, many factors involved in the carrying out of any such process in a satisfactory way, nevertheless, the fundamental fact remains, that the teacher in the schoolroom should be engaged in producing desirable modifications in the cortical synapses.

The intelligence of the individual. It is a commonplace to say that the individual is a complex of his inheritance and his environment. It is but an aspect of this truth to say that, from a psychological point of view, the intelligence, or mental efficiency of the individual depends upon his inherited mental capacity and his training. It is important to have a clear conception of just what these two elements of intelligence mean.

It is necessary for the teacher to have, if possible, some idea where the influence of inherited mental capacity ends and where training begins, to understand, if possible, what is the significance of inherited mental capacity and what it depends upon, to know what training means, and what it may be expected to accomplish. Consequently these two aspects of intelligence will be taken up separately.*

Inherited mental capacity. By inherited mental capacity is meant here an inherited or native aspect of mental ability, which is determined at birth and not modified by training. There are some who would deny the existence of any such predetermined and practically unmodifiable factor in human conduct. There is much, however, to support the view which acknowledges it. In fact certain extremists, generally referred to as determinists, seem to go so far as to consider that this unvarying factor is the only one of importance. The view which is here set forth avoids either extreme, and suggests that the individual intelligence is a component of a fixed factor which may be referred to as inherited mental capacity, and a variable factor which is referred to as training.

There seems to be some physiological ground for such a distinction. Students who are interested in considering

* Many psychologists have well pointed out that any such separation is purely theoretical. We cannot at any given moment in the life of the individual actually separate the two influences. "Even though we find that a group of children, subjected to the same environment (if that be possible) for a period of years, have assimilated different amounts of the environment, all that we can conclude is that the children evidently started in with different potentialities, but we do not know the degree to which the environment did or did not develop these potentialities. . . . Environment and training must play upon native equipment before that equipment can be recognized."

this evidence should make themselves acquainted with the presentation made by Woodrow⁶ who is the authority for much of the physiological material referred to in this section. Certain of this evidence indicates a correspondence between the counted number of brain cells and the brightness of the individual. There is according to certain investigators a rough, though carefully detected, correspondence between intelligence and brain weight. It cannot be said that the brightest men have the heaviest brains, but nevertheless in the long run some correspondence has been discovered. Again, Hammarberg, the Swedish scientist, has found a "clearly demonstrable and striking correspondence between mental deficiency and the number and deficiency in size of the neurones." Furthermore, microscopic studies in human embryology have shown that after the third or fourth month of fetal life the number of cells in the cerebral cortex does not increase.

Thus it would seem that the number of neurones in the cortex is fixed at birth and so a certain fixed factor may be introduced into the mental life of the individual. It is this factor which is referred to as inherited mental capacity.⁷

Microscopic examinations of sections of the cortex of mental defectives have been compared with sections from the brain of normal adults. Such investigations have revealed the fact that the number of cells per unit in the brain of the defective is much smaller than that in a corresponding unit of a normal brain. There is thus a physiological difference between people of not-

⁶ H. Woodrow, *Brightness and Dullness in Children* (J. B. Lippincott Co., 1923).

⁷ This fixed factor may also be complicated by an inherited degree of initial permeability of synapses.

able mental defect and normal human beings. While it cannot be said that no improvement can be made in the efficiency of a defective person nevertheless experience with defectives makes it quite clear that a congenital idiot could never be developed into a normal individual by any series of experiences. Thus it seems that inherited intelligence is a most potent factor in determining human efficiency. While the number of neurones present in a person at birth may not absolutely determine his ability as a social unit it nevertheless places the individual's attainments within certain somewhat definite and significant limits.

Therefore the teacher may regard any child in the schoolroom as an individual whose inherited mental capacity is of a certain fixed status. That is to say the actual number of neurones, and hence of synapses, in the child has a definite effect upon the ultimate degree and nature of his attainments.

It is of great importance for the teacher to be able to recognize the relation of the individual child to others in this respect of inherited mental capacity. Some psychologists have been animated by the hope of constructing mental tests for children which would measure this fixed factor of mental life. When the movement for mental testing became established, the tests were referred to as *intelligence tests*, and the assumption was made by some workers in this field that what these tests measured was the basic, inherited factor of mental life which is here referred to as inherited mental capacity. It was assumed that intelligence tests measured this basic aspect of intelligence independent of the effect of training upon total mental ability. The records of intelligence testing for a long time lent peculiar speciousness to this view for they indicated a remarkable fixity of

mental performance in individual cases in the carrying out of tasks of different types; and in addition to this it soon became clear that there were remarkable differences between different individuals with respect to the difficulty of the tasks which they were able to perform, even when the obvious and observable environment and training of these different individuals seemed to have been very similar. Furthermore, it soon became obvious that usually when two individuals were compared at the age of six on entering school and compared again eight years later after passing through the same school system that the laggard was still a laggard and the bright child had outstripped him far more significantly at the end than at the beginning. As a result some psychologists leaped to the conclusion that a child was placed at birth in a certain category with respect to his intelligence, and in that category he was destined to remain through life.

While the evidence which follows under the heading of *training* will be directed toward showing the inadequacy of any such view of intelligence, yet there is an important lesson to be learned from the state of affairs which caused the speciousness of the evidence misinterpreted by the determinists. This lesson is to be found in the fact that so very influential did the effect of the inherited mental capacity of the individual prove to be, and its effect on mental life was found to be so important, that the eyes of the determinists were blinded to the presence of any other significant factor.

But the making of mental estimates is not new. From time immemorial teachers have made rough comparisons between individuals according to which they would say that Jack was "brighter than" Jill. To-day teachers attempt to make more accurate and refined judgments

by the use of mental tests. Thus they will say that the "intelligence" of Jack is represented by some figure as one hundred, while that of Jill is represented only by seventy-five. Since the average pupil has been discovered to have an "intelligence" represented by one hundred, he, Jack, is considered to be normal, while Jill is somewhat defective. The teacher is thus able to recognize the fact that *other things being equal* Jill will never do so well as Jack, and furthermore that this handicap of Jill's is no mean one, but one that is very serious and significant. Jack has a larger number of neurones in his cortex than Jill.

It would be folly for the teacher to blunder on without recognizing such clear differences. The congenitally bright child and the congenitally dull child need different treatment for their places in society must be different. Furthermore the problem of fostering the growth of the intelligence of the child born dull may prove to be a very different one from the problem of guiding the mental growth of the bright one. The teacher who recognizes the importance of the inherited factor in mental life will be anxious to determine as accurately as possible what is the mental status of each child in her care. A knowledge of the extent to which the ability of the children may depend on their inherited mental capacity may make a world of difference in the teacher's attitude toward and treatment of individual children.

Training. Nothing could be educationally more suicidal than to regard inherited mental capacity as the only important phenomenon in mental life. Infinitely more important to the teacher is that other factor of individual efficiency referred to as training. However important the inherited capacity of a child may be to

himself and to society, the teacher must accept it as it is, and can do nothing to increase or modify it. With the training of the individual, however, the teacher is immediately and directly concerned and by it the nature of society is largely determined.

By the training of the child is meant the change in the individual due to the sum total of environmental influences upon him since birth. Just as there was some evidence to indicate that there is a physiological basis for thinking that there is a fixed factor in mental life, so there is evidence of a physiological basis for the assumption that there is also a variable factor, which may be called training. It is an observed fact that although the neurones of the cortex do not increase in number, they do increase in size and complexity. It has been found that such neurones alter in shape, size, and the number and length of their fibers in the ascending scale from lower to higher animals. Again growth changes have been observed by the microscope in increase in size, shape, and texture of the neurones and in the number and structure of the fibers. It is thus reasonable to suggest that throughout life changes may take place in the cortex due to the increase in size and complexity of the neurone cells. Such changes might result in the modification of connections at the synapses and even in an increase in the number of synapses.

As to the possibility of increasing individual efficiency by the modification of the permeability of the synapses it will appear from the previous discussion that it must be enormous. Thus may environmental conditions become extremely important in modifying the mental life of the individual.

The significance for the teacher is not far to seek. The importance of the teacher's function in mental de-

velopment becomes clear. Granted that the teacher may be concerned with the modification of the permeability of synapses and also with increasing the growth of the neurone cells in the cortex, it may be recognized what are the infinite possibilities of school teaching. There are many educational corollaries, some of which will be taken up later. For the present it is sufficient to point out that while inherited mental capacity may be based on the number, training may be concerned with the complexity of the cortical neurones.⁸

The growth of intelligence. Does the mind grow⁹ through education? Does the intelligence of the individual increase as a result of environmental influences? These are very vexed questions for which the science of education to-day provides no adequate answer. For some time the answer given to these questions by the determinists was *no*. Recently, however, facts have been cited which some claim provide evidence to the contrary.¹⁰ It may not be idle to note that, if intelligence be regarded as in the present discussion, even though the fixed inherited factor may not grow, any growth which is brought about by training might produce an equivalent result. Growth of intelligence might take place in one individual through training which might make

⁸ It should be noted that even without the physiological evidence cited the very nature of the concepts of heredity and environment validates the idea of intelligence as a component of a fixed and a variable factor.

⁹ Growth referred to here is not that which characterizes the development from childhood to adulthood. In this sense the intelligence grows just as the bones and body to a limit which comes at the end of adolescence.

¹⁰ W. C. Bagley, *Determinism in Education* (Warwick & York, 1929). See also Freeman and Others, *Seventeenth Yearbook of the National Society for the Study of Education* (Public School Publishing Co., 1928).

his intelligence equal to that of another individual who might have had a slight initial advantage in inherited mental capacity. In other words, in the case of two individuals different relative amounts of inherited and learned capacity might produce the same final result in mental status of the two individuals.

It is obvious that increase in mental ability may be of two types. The first would be an increase in ability to do an *additional number of complex tasks of equal difficulty* to those done before by the same person. In this sense a child able to read children's stories, but unable to figure, might have his mental ability increased by being taught to do another set of tasks of similar difficulty, namely problems in the common arithmetical processes. The second type would be an increase in mental ability such that the individual would be able to do *tasks which were of greater difficulty* than any which he had been able to do before. It is difficult to give an example here because of our lack of knowledge of the determined difficulty of tasks. There is evidence to indicate that the process of division is more difficult than that of addition. Perhaps, therefore, one might suggest as an example a hypothetical case in which an adult in some institution able to do addition but not division should be taught to do division and derive the power to do other tasks of like difficulty. It is the present impossibility of obtaining evidence that growth of the latter type takes place through education that has influenced the thinking of the determinists. They seem to forget, that even if such growth in mental altitude does not take place, and even that is far from proven, yet there is another possibility. The increase of the width or breadth of the individual's intelligence, the increase in his ability to do different complex tasks of a

difficulty within his mental altitude, must be regarded as an increase in intelligence, inasmuch as it produces in the individual greater social efficiency and increases his usefulness to himself and others. In other words, while so-called intelligence tests may measure the altitude of the intelligence they do not measure its breadth, and so present a totally false picture of the individual's mental and social efficiency.

The modifiability of the nervous system. Training or education is possible because the nervous system is modifiable. The physiological basis of such modification has been here set forth. The assured fact that such change does go on is a sound basis for great hopes from public education. The determinist who considers nothing but the limitations of the child's temporary mental altitude is forgetting the fact that even though the individual's inherited mental capacity may not be modified, the individual may undergo vast and important changes.

Whether or not a child attends school does not determine whether or not such changes go on. They go on somewhere and somehow, as a direct result of the reaction of his organism and his environment. No matter where the child dwells, "among the untrodden ways," like Wordsworth's Lucy, or in the city slums, the environment will have its inevitable effect. Changes must go on, but they may be for better or worse. There are good changes and bad changes. It is the work of the teacher to see that the changes which go on in the child are good changes. Furthermore, the teacher may be very influential in securing these changes. By furnishing the child with a desirable environment, one which calls forth specific responses of the right kind, the teacher may modify the child's nervous system for the better.

The condition of the nervous system. It would not be possible to modify an unresponsive organism. There is a temptation to think of the nervous system as something passive. In its mere gross state that is, of course, so; hence the illusion. The nervous system is, in reality, nevertheless, replete with life. It is, as it were, bubbling over with activity, activity which is stored up and ready to be let loose. It is like a compressed air chamber in which the pressure within is ready to make the air rush forth at the first tiny opening.

The energy which is stored up ready to be set free through the nerves is life. The nervous system is alive. It is like a fuse ready to be set off, like an electric button that waits only for a touch. But nothing so gross is needed to awaken a neurone chain into action. A ray of light, a tick of the clock, an odor, a thought may serve the purpose; any of these separately or many of them at once. Whatever there be that has such an effect may be called a *stimulus*.

We may isolate a stimulus from the total stimuli affecting the individual. When at dusk the electric light is flashed on in a skating rink, the children invariably set up a shout. We would be justified in saying that the flash of light was the stimulus which awakened the response. So we may consider separately a certain special stimulus.

On the other hand, it should be realized that, at a given moment, there are many circumstances surrounding any organism which may touch off a response. For example, consider an old gentleman sitting, of an evening, in a comfortable armchair before the fire. The storm is blowing without, the sleet rattling against the window pane. In the next room his daughter is playing and singing folk songs. He is somewhat weary at the

end of the day, and soothed by the gentle warmth of the fire he drops off to sleep; in five minutes he is snuffling and snoring mildly. Certain elements of the surrounding situation have taken effect while other elements have had none. His organism seemed to ignore the moaning of the wind, the noise on the pane, the loudness of the music in the next room. It responded to the gentle warmth, the weariness, perhaps to the rhythm of the music. There were many elements in the surrounding circumstances which might have affected the old man. Out of these only a certain set took effect.

In the case of the children in the rink, and in that of the old man, the stimuli are spoken of as the *situation*. The situation may thus be a single stimulus or a set of stimuli. It is to be noted that a given environment may provide many situations to which the organism may respond, but the organism generally responds only to certain factors or elements of the immediate environment. Any element or set of elements to which the organism responds may be considered as a *situation*.

Just because the nervous system is replete with life it is ever tingling to make responses. All that is needed to awaken such a response is a situation. The presence of any stimulus to which an organism is sensitive is all that is needed to tap the fund of energy, to awaken the live thing into action.

To the teacher who regards a child as something to be prodded and poked, this should be full of meaning. A boy or a girl is an intensely living thing, full to the brim with responses, ready to leap into action. The inner force is ever present, awaiting only the proper stimulus to call it forth. The magic touch of the good teacher will set off the response which may then be capitalized. The

poor teacher will pinch and squeeze, batter and bruise, to awaken a living thing to a dead task.

The axiom of learning. The discussion of the learning process which follows is based upon a fact so obvious that it might be called an axiom. The axiom of learning postulates that at any moment in the life of the organism it is about to perform some action, to express itself in some form of conduct. There is a certain sense in which the whole nervous system may be considered to be prepared for action. This is true of men and animals in a sense in which it is not true of living plants so that we recognize a quaint humor in the words of the blind man healed at Bethsaida—"I see men as trees, walking." A tree cannot take over any active control of the environment as a man is able to do.

1. *Readiness.* Not only may the whole organism be attuned to action but there are certain circumstances under which certain parts of the nervous system are more ready than usual to become active. It is not difficult to recognize a difference between the nervous condition of the boy who stands at the plate in a baseball game and that of the boy who sits in the bleachers. Neurone chains in the arms and legs of the boy at bat are in a special condition of preparedness to leap into action. A specialized condition prevails in the neurone chains involved in striking and running. The permeability of the special synapses concerned is temporarily increased. We say that the neurone chains are thrown into *readiness*.

In the opposite fashion a set of neurone chains may be thrown into unreadiness. Consider the case of the individual who is being compelled by his pirate captors to walk the plank. Behind him are his persecutors doing all in their power to awaken his leg muscles into action.

In spite of the artificial stimulus the mechanisms involved in walking seem to be in a state of paralysis. The parts of the nervous system involved are thrown into a condition which might be called, for convenience, *unreadiness*. In reality, however, unreadiness is a negative state which is due to the fact that priority is being given to the nervous impulse in other neurone chains.

A similar condition of readiness or "unreadiness" may exist in the nervous system of the child in the school-room. The sounding of the bell for dismissal throws the nervous system into a condition for playtime activities yet the teacher expects the child to listen in calm inactivity to the assignment of to-morrow's lesson in grammar. The child is in the midst of an interesting bit of creation in the drawing lesson, yet the close of the period comes, and he must attack a problem in factoring. Carelessness with respect to readiness and "unreadiness" of the child's nervous system may cause much needless friction in school life. It is not here suggested that the child should be permitted to follow his own caprice but that that caprice is something to be understood and bargained with.

2. *Interest*. This matter of readiness seems to be at the basis of what is known as interest. It is well to realize that the condition of interest or lack of interest has its counterpart in the condition of the neurone chains. Interest has a physiological basis in the temporary permeability of the synapses. Before real interest can be awakened the physiological condition of the child may have to be modified. When the desired interest is manifested it should not be thwarted.

The origin of readiesses. The condition of special readiness in an organism confronts us with the difficult problem of the way in which that generalized energy,

the presence of which is axiomatic, is diverted into one path, channel, or set of neurone chains rather than into others. Unfortunately this problem is complicated by the almost indistinguishable influences of heredity and environment. It is comparatively easy to explain the conduct of a young man who, seeing an apple on the sideboard, picks it up and eats it. He has eaten apples before and the reaction has its basis in habit. But what of initial responses, responses made by an individual for the first time, such as the crying responses of a newborn baby. They must find their origin in certain inherited conditions whereby certain synapses are predisposed to special permeability, predisposed to the passage of the nervous impulse. It seems scarcely possible to say more than that at any time a specific readiness is due to permeabilities of the synapses which are the result of inheritance and learning.

It might further be added that while there is nothing in observed physiological behavior to indicate anything which might be called volitional control of the permeability of synapses and hence of readiness, interest, and conduct in general, yet the absence of such evidence does not prove that the life force in the organism may not assume something which might be described as volitional control.

Elements involved in the nervous act. By the nervous act is meant simply any piece of conduct, any *doing* which involves the nervous system, any act of any part of the organism. Such a nervous act has been analyzed into three elements, each of which is significant in the understanding of human conduct. These elements have been called (1) the situation, (2) the bond, and (3) the response. (Sometimes indicated by the formula $S \rightarrow R$.)

Every nervous act involves each of these three elements. The response is the active observable expression of the life that vitalizes the organism. The situation is the stimulus which calls that response into being. The bond is a neurone chain predisposed to carry the nerve impulses concerned inward to the brain and outward to the responding organs. Without these three elements no human action can go on.

Examples may make this clearer. Consider a simple act such as the eye wink. The response is the muscular twitching of the eyelid; the situation is that of a cinder being in the eye; the bond is a chain of nerve cells and synapses which carries the nervous impulse from the sensitive parts in contact with the cinder to the central point of redirection and back again to the muscles involved in effecting the wink.

A more complex case might be that of E. V. Lucas's amiable farmer, who fails to visit his righteous wrath in the orthodox fashion upon the boys who have stolen his apples. He sees the boys approaching munching his juicy red fruit. Perhaps the thought arises in his mind, "They stole my apples." This awakens the thought, "Well, I have plenty anyway, I like to see the youngsters having a good time." Then he speaks up, with a laugh, "Hello, you young socialists!" Here the situation is the presence of the boys eating the forbidden fruit, the response is the unexpected remark, the bond is a series of neurone chains carrying the neural current from acting end organs in to the associative areas of the cortex, then from idea center to idea center, and outward to the muscles involved in speech.

The response. Every movement in the human body is a response to something. All conduct is made up of responses. We are interested in responses which have

taken place in the past, in observing present responses, in causing responses, in predicting responses. For the teacher, the response means the very important matter of what the child does. There are desirable responses and undesirable responses. To produce the desirable ones, to prevent the undesirable ones; to destroy the bad ones and to perpetuate the good ones; these are no mean tasks for the teacher and the school.

The situation. The situation is that part of the environment within or without the organism which is an immediate cause of the response. Crowding about us on every hand is a multitude of possible situations. The flowers on the table before me may suddenly prompt me to stop work and smell them. The telephone bell may call me to answer, the presence of the keyboard of the typewriter may cause me to tap out my sentences upon the keys. A thought of a friend may prompt me to write him a letter. To the child in the schoolroom a bird flying outside the window may awaken ideas of a catapult and so begin a reverie on spending the out-of-school hours; fear of the teacher and the presence of a problem on the board may stimulate the mind to unwilling arithmetical thinking; an illustrated copy of *Treasure Island* may call to the reading table.

The teacher should realize that everywhere about the child in school lies an environment, of which any element or any combination of elements may at any moment awaken a response. Some of these elements will awaken good responses, others will awaken bad ones. If the wrong elements of the environment have become potent, or if there are more wrong than right elements, the child's actions will be bad. If the proper elements abound in the environment the child will be stimulated to conduct which is profitable. It is part of the teacher's

work to arrange situations to which the child will respond in ways that are desirable.

The bond. The bond is nothing mystical or imaginative; it is a chain of neurones with a physical existence in the body and is characterized by a certain degree of resident readiness. It is obviously something with a real, concrete existence. If there were no bond there would be no act. When there is in the environment an element to which the bond is in readiness to react, the bond carries the nervous impulse to the responding organ. When there is no such element the bond is present but not functioning. A bond is a neurone chain with a predisposition to act when certain elements are present in the environment. The nervous system may be compared to a telephone system. The connections to a million telephones are lying idle. When one person raises his receiver, a telephone bond to Central is called to life. The person¹¹ who raises the receiver plays the part of the stimulus, Central acts as the response, while the telephone wire is the bond.

This illustration may be further applied by calling attention to the fact that the individual telephoning can not reach the house of a friend who has no telephone. There is no wire to that house; no bond. So in the nervous system a response can not be made to an element in the environment when there is no bond, or neurone chain with a disposition to act, from that situation to that response. A man may be very hungry yet pass by a snake or an edible grasshopper. The same man will eagerly devour a slice of roast beef or probably raw

¹¹ Note, however, that a situation in the environment may not assume volition as does an individual who raises the receiver and calls for a specific number.

oysters. The man has no bond between the grasshopper and the eating responses, but he has a bond between roast beef and the eating responses. Conduct depends upon the presence of numerous neurone chains involved in such conduct.

The relation of the nervous act to the teaching process. Poor teaching may result from the neglect of any of the three elements of the nervous act. The teacher who expects a child to act without relation to his environment commits an error which may cause much trouble. The teacher who rests the child's responses on the lap of the gods and hopes for the best is on the wrong track. The teacher who ignores the actual presence of certain bonds in the child and the absence of others ignores a stone wall.

It has been pointed out that responses may be either good or bad. The teacher is seeking for certain definite responses from the child. She wishes the child to sing in a sweet-toned head voice, not in a thick guttural one. She wishes the child to respond by carrying some worthy task to completion and not to respond by prodding his schoolfellow in the back. It is the part of the teacher to select the desired responses and reject the wrong ones. It is not the part of the teacher, however, to be horrified at the wrong response, but to discourage it. Nor should she merely thank heaven for the right response, but rather encourage it. A response is not an accidental but a caused phenomenon.

It is for this reason that the teacher should be particularly concerned with situations. It is frequently easier to remove the causing situation than it is to punish the unfortunate response which it awakens. It is often easier to provide a stimulus to right conduct than it is to prevent reaction to a wrong one. Many a teacher allows the

class to become drowsy by permitting the thermometer to rise too high. Many a child falls into mischief as his companions drone out the reading which is in print before him, whereas he would listen to something which he himself had not read. If the right situation be provided, the right response is likely to follow.

It is not wise for the teacher to depend upon any bond which does not exist in the child's organism. The teacher who trusts a child not to copy his homework or to cheat in his lessons should first be sure that the bonds involved in trustworthiness exist. Neither is it wise to refuse recognition of bonds which really do exist. What child can resist the fascination of daydreaming, or the wandering pencil in an idle moment? Bonds which are present should be reckoned with, those which are absent should not be depended upon.

Effect of satisfiers and annoyers on the nervous act. It has just been pointed out that the teacher may do much to cause the right response by furnishing the right stimulus. But not only does the teacher want to cause the right response, but to give it a degree of permanency. For instance the teacher may bring about a situation which invites a child to print its name on a book it has made. The child, Alice, makes a good A from the copy. The environment has stimulated the right response. That however is not enough for the teacher. She wishes that the child should continue to make a good A. The contrary is true of a wrong response. If the child makes its l as short as its i the teacher does not wish that response to be repeated. So the teacher is ever anxious to select from the many responses which the child makes, those which are important and good, and to reject those which are negligible or bad. How may this be done?

The answer to the question lies in the fact that a

nervous act never leaves the organism in exactly the same condition as that in which it was before the act took place. Not only is the nervous system modifiable but it is modifiable by its own action. Human nature grows into its own modes. Human conduct tends to become cumulative. "He that is unjust, let him be unjust still: . . . and he that is holy, let him be holy still." The result of the life process tends to make the repetition of a response stronger, especially under certain conditions. On the other hand, the repetition of the response is made less likely by the presence of other conditions. That is to say that the bond between a given situation and a given response may be either strengthened or weakened. If the bond has been strengthened the same response is more likely to be made when the same situation recurs. If the bond is weakened the response is less likely to occur when the situation recurs. As a result of every nervous act the permeability of the synapses involved is either increased or diminished.

By a useful figure of speech Thorndike has referred to the conditions which strengthen bonds as satisfiers, and the conditions which weaken bonds as annoyers. When a response is accompanied or followed by a satisfying state of affairs its strength is increased, when it is followed by an annoying state of affairs its strength is decreased. For example, a child who is rewarded by some satisfying toy or attention whenever it cries will be the more likely to cry once more when anxious for attention. Again, it is sometimes possible to prevent biting the nails by painting the ends of the fingers with some bitter substance. The response of nail-biting is accompanied by the disagreeable taste which breaks down the bonds involved in biting.

But this superficial meaning of the word satisfier is

not its true psychological meaning. By conditions which satisfy Thorndike means conditions which satisfy or further the life processes of the neurones.¹² This somewhat obscures the exact meaning of the word *satisfier*, so that for practical purposes of teaching it is perhaps as well to adhere to the figurative significance of the word.

To return then to the original question, how do satisfiers and annoyers aid the teacher in making permanent the responses which she wishes to preserve, and destroying the bad responses? The abstract process is simple enough. Reward the desired response; punish the undesirable. When a child does what is right its conduct should be followed by some such satisfying condition as the consciousness of a task well done, approval of his companions, or the experience of the value of his finished work. When he does wrong the annoying circumstances of self-censure, social disapproval, or unfortunate consequences should follow. The actual carrying out of such laws in the concrete affairs of the schoolroom is no simple task, nevertheless, this is the nature of the educative process.

Multiple response a phenomenon of the nervous act. It is a phenomenon of the organism that a creature, man or lower animal, will continue to make responses to a single situation until some response is followed by a satisfying state of affairs. An organism does not make one single response to a stimulus and then lie at rest, whether or no the desired end has been accomplished. A human organ is not like a railroad signal which can make but one unvarying movement to a given stimulus; rather does it follow the "try, try again" principle.

¹² Sandiford, *op. cit.*, p. 196.

Thorndike's cat imprisoned in a box fastened with a button made a series of attempts to get out to eat the fish which it could see and smell. If a cat reacted to a situation in the same way as a railroad signal it would make one movement, with its paw, for instance, and then lie down in the cage abandoning the attempt. What really happened was that the cat instituted a succession of movements. The first clawing movements failed; the cat's eating mechanisms which were in readiness to act were thwarted so that it was discouraged in the useless movements. It continued to vary its movements until a random stroke turned the button and the creature was freed.

The principle of multiple response is easily understood in terms of the modifying effect of satisfiers and annoyers on the permeability of synapses. The useless movement of the cat being followed by a thwarting, which may be called an annoyer, was partly broken down by a temporary decrease in the permeability of the synapses brought into action. The permeability of these synapses being increased the nervous impulse awakened by the continuing situation took another path. So the process continued until a lucky response occurred. Thus, it may be seen, the phenomenon of multiple response has a physiological basis.

Stout¹³ gives an account of a dung beetle making instinctively a series of responses in an attempt to roll its egg-laden mass past an obstruction. It might not be strange to expect that instinct would provide the organism with a definite rolling response. One might be inclined, however, to think that the failure of that reaction to accomplish the rolling would be followed by just not

¹³ G. F. Stout, *A Manual of Psychology* (W. B. Cline, 1913), p. 345.

any response. This is not so. The accidents which befall in this complex world must be provided for. So the pushing and pulling movements being unsuccessful, they are followed by various other attempts, one of which is finally effective.

If there were no such thing as multiple response, learning by trial and error would be impossible. The child who attempts to unscrew a trick bolt is likely to proceed by trial and error. He handles the bolt in one way, this fails, he makes another random trial, so that he alters his mode of attack on the puzzle until by chance he hits on the correct solution. Even then he may not know how he has attained his end. Several trials will, however, finally make it clear. Because of the multiple response of his organism he has by trial and error learned to solve the puzzle.

Trial and error is a very wasteful way of learning. It often happens that a teacher may be of great assistance in pointing out just what response will secure the desired result. The child who is floundering with a problem in arithmetic may be helped by a little guidance. Children should not always be left to work out things for themselves. The benefits of experience can often be transmitted by the indication of the right response where many wrong ones are possible.

The laws of learning. A consideration of what has been here set forth is sufficient to make one realize that learning ¹⁴ does not go on at haphazard. From the facts

¹⁴In an unpublished manuscript Bagley says "The so-called laws of learning, of which the law of exercise is one, are not laws in the sense in which the physicist uses that term; they are rather hypotheses based very largely on neurological speculation—hypotheses which are fairly although not entirely satisfactory explanations of the conditions under which learning takes place

which have been presented concerning the nervous system it would be possible to map out certain principles which govern learning, to embody in words the essence of the conditions which govern the learning process. This has been already done and a set of principles have been formulated by Thorndike which he calls the laws of learning. These three primary laws of learning are best recalled by retaining the names given them, the Law of Readiness, the Law of Exercise, and the Law of Effect. It is to be observed that they are based on the axiom that a living organism is always predisposed by heredity, or training, or a combination of both, to do something.

The Law of Readiness. The Law of Readiness is as follows: *When any conduction unit is in readiness to conduct, for it to do so is satisfying. When any conduction unit is not in readiness to conduct, for it to do so is annoying.*

In this statement a conduction unit is obviously what has here been referred to as a neurone chain. The mere functioning of a neurone chain is accompanied by a state within the organism which acts as a satisfier. On the contrary, failure to function produces annoyance. When the specialized condition of readiness pervades a series of neurone chains the consummation of the act for which the neurone is prepared is accompanied by satisfaction, its thwarting by dissatisfaction or annoyance. The person who decides to play through, on the piano, the old familiar tune "The Last Rose of Summer" anticipates a succession of familiar intervals, so that the playing of

—namely the plane of specific habit. They are entirely inadequate as explanations of, or guides to, the higher types of learning, including the mental functions that we recognize under the terms, deliberation, judgment, and choice."

the tune is accompanied by an agreeable feeling. To be interrupted in the middle by a call to the next room is, so any musician will testify, most disagreeable. Satisfaction at a task completed is an illustration of the working of the Law of Readiness; so also is annoyance at a surly interruption. The law might be restated thus: *When a neurone chain is in readiness to conduct it is satisfying for it to do so, annoying for it not to do so.*

The Law of Exercise. The Law of Exercise is in two parts, the Law of Use, and the Law of Disuse. The Law of Use is as follows: *When a modifiable connection is made between a situation and a response, that connection's strength is, other things being equal, increased.* The Law of Disuse is stated thus: *When a modifiable connection is not made between a situation and a response, during a length of time, that connection's strength is decreased.*

The Law of Exercise is related to what was set down under the section on the modifiability of the nervous system. It is thus that we learn and forget. Except for the qualifying phrase "other things being equal," this law is similar to the old maxims, "Practice makes perfect" and "We learn to do by doing." What we have read recently we tend to remember best; what we have not read for years we tend to forget. To express the Law of Exercise in a slightly different form—*Other things being equal, to function strengthens a bond, not to function weakens it.* To strengthen a bond is to increase its inherited or acquired predisposition to react in the presence of a certain situation.

The Law of Effect. Perhaps most significant to the learning process is the third of these laws, the Law of Effect. It is related to the other two and is stated as follows: *When a modifiable connection between a*

situation and a response is made and is accompanied or followed by a satisfying state of affairs, that connection's strength is increased; when made and accompanied or followed by an annoying state of affairs, that connection's strength is decreased.

This is exactly in accordance with what has previously been said as to satisfiers and annoyers. We learn very quickly the things we like to do; what we dislike is most difficult to learn. It is to be particularly noticed that there are two ways in which satisfiers and annoyers may affect the nervous act, before it takes place, and after it is over. If *before* an act takes place the neurone chain is thrown into readiness a satisfying state of affairs will follow, according to the Law of Readiness; if after an act has taken place a reward is attached the same effect follows. So an engine may be attached behind a train to push or in front of it to pull. Summing up the educational significance of the three laws of learning it might be said that the learning process is furthered by motivation, exercise, and outer or inner rewards, and hindered by their opposites. The Law of Effect might thus be briefly stated: *Satisfiers strengthen bonds; annoyers weaken them.*

The complete significance of the laws of learning will not be fully grasped unless it is clearly realized that they are laws. Laws are formulated truths. The laws of gravitation are not theories made up to explain the way gravitation acts, they are observed truths about gravitation. Any physicist who is dealing with gravity must not violate the conditions imposed by the laws. So it is with the laws of learning. So far as can be scientifically observed in such a difficult science as psychology the laws of learning are the laws which govern the way in which we learn. For the teacher to violate these laws

is for her to upset the learning process. The teacher who expects to create an interest in arithmetic by frequent punishments violates the Law of Effect and the child learns to dislike arithmetic. The teacher who can make him conscious of his achievements secured by earnest drill awakens an interest in his work.

Types of learning. Essentially, learning is the linking of situations and responses by bonds. As has been pointed out it goes on in accordance with the laws of readiness, exercise, and effect. This might be the more clearly understood after a consideration of an actual case of learning. It is possible to make a distinction between two levels of learning, learning of the simple animal type, and learning involving ideas. These will be considered separately.

Learning of the simple animal type. Thorndike's cat, already mentioned, learned to free itself from its latticed box in some such manner as the following. (It should be understood that the cat as a living thing had a tendency at the time to do something). The smell of the fish outside the cage threw certain nervous mechanisms into a condition of readiness. The cat began to make this, that, and the other response in an attempt to get out of the enclosure. The first series of responses, being followed by the annoying situation of being thwarted in gaining the fish, were broken down. Due to the phenomenon of multiple response the cat set up other responses, and so on, until a random stroke of the paw turned the button and the cat was freed. The satisfactory state of affairs which followed on the obtaining of the fish had the effect of strengthening the bond involved in turning the button.

The cat was again returned to the cage several times. It instituted various random movements as before. After

several experiences, it did not, however, take the cat so long to free itself as on the first occasion, for the random and useless bonds were weakened, in the same way as before, and the bonds involved in the successful moving of the button strengthened. Several repetitions of the imprisonment soon trained the cat to free itself immediately. No sooner was it placed in the cage than without any wasteful movements it would strike the button and walk out.

There are three things which might be pointed out concerning the condition of the cat when placed in the cage for the second time. (1) It had already learned something with respect to the way to free itself. The right bonds had already been strengthened by the single successful response. (2) What it did learn was not due in any sense to the presence of ideas, to the intervention of reasoning. The cat did not, as it were, sit down upon its haunches, when placed for the second time in the cage and say to itself "I got out before by hitting the button, therefore, I will hit the button again." A human being might do so, but a cat does not. The reason the cat strikes the button on the second or third occasion somewhat sooner than it did on the first is due to the fact that the bond involved was strengthened by the satisfaction of being free and reaching the fish, not because of the intervention of any process of reasoning. (3) Although the cat had after the first imprisonment already learned something with respect to the way to free itself, it had not learned it as thoroughly as it did by repetition of the proceedings.

This process by which the cat finally learned was the learning process on the animal level. It might be called training, drill, or habit formation. The cat was trained to free itself. It was drilled in the process of opening

the cage. When it had gone through a series of trials it formed the habit of getting out quickly.

This type of learning goes on without the intervention of ideas. It does not involve reasoning. It is very necessary for the teacher to understand the process for much of human learning goes on in this way by trial and error without the intervention of ideas.

Learning of this simple animal type, which does not involve reasoning, goes on in human beings to a greater extent than one might at first imagine. Thorndike¹⁵ gives examples:

This type of learning occurs frequently in the acquisitions of early infancy, in "picking up" swimming, or skating undirected, in increasing the distance and precision of one's hits in golf or baseball by the mere try, try again method, and in similar unthinking improvement in penmanship, acting, literary style, tact in intercourse, and indeed in almost every sort of ability.

Learning involving ideas. The intervention of ideas in the learning process may very much shorten it. Supposing that the cat in the cage had been able, by the intervention of inferential reasoning to say, "I got out by hitting the button before, therefore, I will hit it again," it would have learned much more quickly. So the reasoning process comes to the assistance of the learning process.

Consider the child who is attempting to open a trick lock. He makes various random movements similar to those of the cat, attempting to free itself. Finally by inverting the lock he opens it. If he is a bright child he

¹⁵ E. L. Thorndike, *Educational Psychology* (Teachers College, Columbia University).

will observe that the lock opens when turned upside down. From then on he opens it easily.

The situation may be analyzed thus. In the attempt to open the lock the child makes various random movements. The false bonds are broken down by dissatisfaction. The right bond which involves neurones in the cortex is strengthened. The involvement of the cortical neurones or the intelligence makes learning more rapid and simpler. It is still to be made clear that this learning, which goes on via the cortical neurones is governed by the same laws as learning of the common animal type.

The fact that simple animal learning and learning involving reasoning are similar in nature may be made plainer by a consideration of the actual path of the nervous impulse. In the cat the situation of *being-imprisoned-with-fish-outside* awakened a nervous impulse. This traveled via neurone chains from sight and smell inward to the brain but not to the idea centers, then outward via the neurone chains to clawing and scratching. As these movements failed to accomplish the desired end a new series was instituted via other neurone chains out and in, finally via a series of neurone chains the desired response was effected and strengthened. In the case of the child the situation—a *trick-lock-to-be-opened* awakened the impulse which traveled inward and outward via neurone chains until the lock is opened. On the second occasion the impulse goes in to the cortex via the neurone chains but on reaching the cortex it travels via the neurone chains there which are concerned in the idea "I did it before by inverting the lock, therefore, I will invert the lock," then the impulse traveled outward via the neurones involved in inverting and opening. The neurone chains, including those in the cortex,

were strengthened by satisfaction and so learning went on as before. The child has learned to open the lock.

An attempt has been made by tracing out roughly these neurone chains to make clear that the higher type of learning involving reasoning goes on in the same way as learning of the simpler animal type. That is to say, the three laws of learning govern not only the simpler forms of learning by trial and error but also the more complex forms of learning involving reasoning. This is true even of the purely intellectual process where the stimulus is an idea and the response another idea; where all the neurone chains involved are within the cortex. That is to say, even philosophical thinking seems to go on in accordance with the three laws of learning.

If this be so, then it is very important to consider the nature of this learning process. It has already been pointed out that it is in the nature of training, of drill, of habit formation. From the limited point of view of physiological psychology the statement is therefore warranted that, functionally considered, all learning is in the wide sense habit formation, or training.

Habit may be considered either in a *wide* or *narrow* sense, as habit formation is a relative matter. A person who has once struggled through the tying of a bowknot may be said to have laid the first stone in the habit structure to follow. Habit in this wide sense would include even such learning as that due to a single strengthened response. But in the ordinary or narrow sense of the word, a person would have to tie a bowknot many times, and become proficient in the operation before one would say that he did it habitually, that the tying of a bowknot had been relegated to the realm of habit.

Since common usage and psychological terminology usually refer to habit in this specialized sense, it is probably better to adhere to such a use of the term, to mean a well fixed response. Consequently the word *training* is perhaps better suited to describe the learning process. What it is here desired to emphasize is this: that when the word *training* is used it is intended to indicate a process which goes on exactly as habit formation goes on in accordance with the laws of learning; that in the narrow sense habit formation is merely training which goes on for some time until the response is overlearned, or firmly fixed.

This functional definition of learning as training is immensely important for the teacher. It means that not merely are our physical responses, such as those of penmanship and physical drill, affected by training, but that our intellectual modes of thought are in all probability similarly affected. A child may be trained to like mental work or to dislike mental work, to have a happy outlook on life or a pessimistic one. Furthermore our moral life must be susceptible to education. A person may, other things being equal, be trained to steal, or not to steal, as he may be trained to raise his hand in school or not to raise it. Not merely our gross physical actions but our philosophy and morality are to a certain extent the result of our original inheritance and our training.

The higher realms of mental conduct. It would be convenient, for the sake of simplicity and clearness, to drop the matter of learning at this point. Unfortunately, however, the physiological theory of behavior which has been developed in this chapter, while it is of immense practical value in the concrete problems of teaching, is undoubtedly inadequate to explain the intricacies

of the highest forms of human conduct. Bagley¹⁶ states the case vigorously in the following words:

I am personally convinced that the attempt to apply on the social-moral levels a mechanistic psychology derived largely from animal and primitive human behavior plays the veriest mischief with our thinking. . . . I maintain that the alleged laws of exercise and effect, which are based on primitive functions, are likely to work havoc when extended to the higher functions. Such applications seem to follow the course of logical consistency and continuity, but they overlook a basic fact, the fact, namely, that new combinations of structural elements, whether in the world of matter or of life, the world of mind or the world of society, will have properties or functions quite different from the qualities and functions of the elements of which they are structurally composed. You may speak of the habit of making right choices, but the moment you make any choice a habit, it is, of course, no longer a choice.

To put the matter plainly the higher levels of mental life do not seem to be fully explained by the physiological psychology here presented, or by any other psychology developed up to this time. It may be well for physiological psychologists to admit that when they reach these higher forms of learning they are at loss to give further explanation. Those who wish to go further must abandon any attempt at objective scientific psychology and enter the realm of pure theory, a realm which is not clearly mapped out because it is so very vaguely understood. If the psychologist did understand this uncharted limbo many of the vexing problems of education which are to-day the subject of endless controversy might no longer trouble us. We had better frankly admit our ignorance and agree to differ amicably

¹⁶ Unpublished manuscript.

with those whose theories of conduct on the higher levels do not agree with our own.

One thing seems sufficiently clear to all but a comparatively few extremists, namely, that our mental life is not the inevitable and inert product of our inheritance and our environment which a consistent and unswerving adherence to an unmodified physiological psychology would pretend. There seems to be, in most people, a deeply rooted and almost universal consciousness of the possibility of the intervention in the higher forms of mental life of a phenomenon for which a rigid psychophysical parallelism affords no place, namely the phenomenon of choice, or what is sometimes called "free will." Few common men believe that we are frail barks on the sea of life, tossed here and there by the merciless seas of inheritance and buffeted this way and that by the relentless winds of environment. Rather do we feel that the craft in which we sail is controlled by a rudder which responds to our will and which, granted fair weather, will guide us submissively enough to one port or another.

We may leave the naming of the phenomenon just referred to, to writers in the field of philosophy. Concerning its guidance and development and control physiological psychology gives no light. The philosopher may point out that there are varying ideas as to what type of school work contributes to its best development. On the one hand there are those who maintain that it is built up by discipline leading on to freedom, while others believe that the most healthy course for its growth is freedom expanding into creation. Might one venture to suggest that a mixed régime is not out of the question?

Educational corollaries. In the meanwhile teachers are comparatively safe in making use of the teaching of

physiological psychology in guiding the learning process on the lower levels, with which they are largely concerned. In matters of learning which are connected with conduct on the higher levels we must recognize that we ourselves, as well as those with whom we disagree, are in the region of pure theory. For purposes of methodology the present discussion must stand by the ideas which have been presented in this chapter. One of the main points which the author has hoped to make clear is a corollary of this conception of education as training. Since a child's physical, mental, and moral responses are subject to training, the child should be trained to make the physical, mental, and moral responses which are good for him to make, rather than to make other responses. Simple as this proposition may seem it does not govern the educative process as administered by many teachers. The average high-school algebra student is trained in intricate intellectual processes, such as the binomial theorem which there is small likelihood of his using during the remainder of his life. Many a child is taught to memorize the spelling of such teasers as *phthisic* who will in all probability never even see the word in print, let alone write it.

Such subject matter is defended by those who put in a plea for mind training. Mind training is good but it is not alone enough to justify any element of the curriculum, at least in the elementary school. One does not teach a man to drive a horse and carriage in the hope that the mind training he receives will enable him to drive a Ford. Such is the philosophy which directs much of the teaching process. Such elements of the curriculum, which train children's minds in indifference to their life needs, are not training children to make the responses which are good for them to make, but train-

ing them to make other responses which may help out.

But all such sins of education are not those of commission. Are there not schools which have omitted from the curriculum the training for many valuable responses? Does the teacher tell the child not to copy his work, or train him not to copy it? Do the schools build up civic responses which will function in the grown-up life of the adult? Are there folk in the community who injure their health by neglect of health habits for which the school might have trained them? Has the reader of the yellow journal been forced to read good literature in school or trained to read it? Are children learning to do in school the things that it will be well for them to do when they are out of school?

The best way to build a bond is to build that bond according to the laws of learning, not to build another bond which seems to be like it. The best way to train a person to do a thing is to train the person to do that thing and not some other thing. The best way to train a person to live is by having that person live as he should live. The best way for the schools to train children to live in the world is by having them live in right ways during school hours.

The activities of the schoolroom should lead on to the activities of the adult world. Fortunately this is possible, for the tendencies and impulses of the child are not foreign to the man but are the materials which if rightly guided are the basis of his proper development. The love of the little girl for her dolls is the basis of the maternal responses, and if given normal expression will enrich the condition of motherhood into which she is to develop. The pugnacious characteristics of the boy are the basis of the man's food-getting and family-protect-

ing impulses, and if developed under proper control contribute to the homekeeping responses of the father. These are but examples of the leading on activities which are living for the child which lead on to living for the adult. The school which believes in education through living will capitalize such responses, and make them the beginning points for training.

As an example of the way in which school activities may or may not be such as to develop into right modes of adult living one might take the case of the reading of a given individual. In what manner does the grown-up go about choosing the things which he reads? If the school has trained him to the familiar use of libraries, has built up his taste, he will choose what is good. If the school has simply compelled him to read whatever was dictated as the lesson, he is at a loss when it comes to making his own choices, he is at the mercy of such popular guides as the magazine stalls and the newsboys. He is trained to take what is given him, not to choose what he likes.

It is to be noticed that if the actual conditions of reading as it relates to living prevailed in the school-room, on the child's level, the child might be so trained as to cope with the adult world when he grows older. Supposing the school work were so arranged that the child could have at his own disposal, in or out of school, a certain amount of leisure which he might like to devote to reading. Suppose that matters were arranged so that during that time the child were provided with a wide range of intellectual fare, of direct interest to him at that age, such as could be found in a well equipped library of children's illustrated books. Supposing he were given little guidance but that of the social prestige obtained among his schoolmates for having read what was admit-

tedly worth while. If such conditions prevailed would the child not have some basis in his school experience which would function practically without loss in the big world which he must enter on leaving school?

If, on the other hand, the school teacher provides Johnnie with a text of brief selections, instructs him to read pages 25 and 26 for Monday, a portion from Hugo's *Les Miserables*, forces him to listen to his best chum bungle through the reading of it two days later, then requires him to struggle through it before a group of apathetic or restless comrades, then tells him to study the notes at the back of the book, to read the life of Victor Hugo in the encyclopedia, and write the story of Cosette in his composition book,—if these things go on, where is the preparation for living? What parallel is there to this in living in the big adult world? If this were preparation for living then our adult banker at the club would receive orders from a servant after luncheon to read a recent book of Carl Sandburg's poems, to his assembled friends, his friends would then reread the poems to him, he would spend a half hour or so consulting reference books on the shelf nearby, read an article on Sandburg in a current magazine, and write a few lines on Sandburg's style to read to the family at the dinner table.

This fantastic illustration, in spite of its seemingly facetious tone, has an important significance. If children live in the schoolroom in ways which are remote from both child and adult life they do not learn to live in right ways in the work-a-day world. Furthermore, it is possible so to organize the work of the schoolroom that children will be engaged in ways of living which are adapted to their own present life needs, and which will, at the same time, develop and ripen into desirable forms

of living in the adult world. This is education through living.

PROBLEMS FOR CLASS DISCUSSION

1. Give an account of any action of an individual which indicated an unscientific attitude toward a child. A scientific attitude.

2. To what degree would a thorough knowledge of neurology contribute to the teacher's ability to govern the learning process?

3. Choose some concrete nervous act, simple or complex, and state clearly the situation, the bond, and the response.

4. In what respect is the telephone system a good and a poor analogy to illustrate the learning process?

5. Explain, in terms of this chapter, a child's learning to tie a bowknot.

6. Explain, in terms of this chapter, such a complex ability as the ability to write *A Midsummer Night's Dream*.

7. Explain the character of Lincoln in terms of the material of this chapter.

8. A teacher in charge of the conduct of a group of boys, in visiting the dormitories asked a normal boy, aged 12, if he had obeyed the rule to clean his teeth regularly every day in the week. The boy said "No." Corporal punishment was given. Discuss the learnings involved in terms of this chapter.

OUT-OF-CLASS ACTIVITIES

1. Read the short story "Square Baby" in the December 1928 issue of *The Journal of the National Educational Association*, p. 287. The story illustrates the scientific attitude toward child behavior.

2. Draw a diagram of a neurone chain.

3. Form some new habit which will be useful to you, such as that of drinking a glass of water immediately upon arising every day. Consider the learning process involved with respect to:

1. Parts of the nervous system involved
2. Intelligence, training, mental efficiency

3. Modifiability, permeability, elements of the nervous act
4. Readiness, satisfiers, and annoyers
5. Laws of learning, multiple response
6. Learning of simple animal type, learning involving ideas
7. Educational corollaries

4. Spend an hour or so in the company of a child, observing his reactions. Consider his personality traits and make a record of your findings. The following suggestions may be helpful:

1. Physical—age, general appearance, defects, health and health habits.
2. Mental—intelligence, achievement in complex habits.
3. Emotional—behavior patterns. Tends to retreat from reality to inner thought or dreams (introvert). Tends to be absorbed in realities, in outer objects and activities (extrovert). Disposition.
4. Environment—How has home and social environment affected appearance, reactions, knowledges, habits, language?

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CHAPTER III

THE SCHOOL AS AN ENVIRONMENT

One of the major problems of education should be the provision of a right environment. This is the more perfectly realized when it is remembered that a child will react to the environment automatically, without any assistance from a teacher, or from any one else. If a small child be left alone on the floor with some blocks it does not sit apathetically by and wait for some one to coax it into action, it immediately falls to eagerly and plays with the blocks. This tendency of a normal child to react to blocks by constructive movements is a strong one. The writer recalls one child, brought to kindergarten for the first time, who refused to move from his chair, even far enough to look at the children in the next room. When some kindergarten blocks were silently placed within his reach he reacted within thirty seconds, and the blocks were the means of introducing him to the regular work of the kindergarten.

This principle of direct reaction to environment is readily understood in terms of the material of the last chapter, where the nervous act was defined in terms of situation, bond, response. It was there pointed out that when a bond is predisposed to act the situation alone is sufficient to set off the response via the bond. All situations must exist in the environment.¹ The environment

¹ The use of the environment in its widest sense is intended to include the condition within the individual himself.

is the source of all stimuli. The whip of the jockey which speeds up the race horse is part of that animal's environment; the printed notes on the symphonic score are enough to awaken a great orchestra into action. The "still small voice" may stir some reformer into a fervor that may change the life of a nation. So it is that by the mere provision of right environment the teacher may fulfil one of the most practical conditions of the learning process.

What environment is. In one sense the environment may be thought of as the sum total of stimuli which surround the organism. A more concrete and practical idea of the environment may, however, be developed. There are certain large general factors of environment the effect of which must be bargained with in public education.

An analysis of environmental factors may be made on a basis of what are, from the teacher's point of view, narrowing circles of influence upon the individual. Thus, the general sphere of environment might be divided into the world in general, the community, the family, and the school. With the school we are here particularly concerned. In the school are many sources from which may come stimuli which will determine conduct. In the first place there are the school buildings and grounds; there is the actual schoolroom in which the child spends his time; there is the library, and other supplementary rooms; there are the other children, the curriculum, and last, but in another sense first, the teacher.

The school building and grounds. So far as the actual learning process is concerned, one might be inclined to consider the school building as a necessary evil rather than an active aid to teaching. Its function is to shelter the children from the weather (for at least 50 per cent

of the time they would be better without this shelter), to control a number of children at once, and to act as a convenient storeroom for materials. In the actual school building, no matter how up-to-date it may be, there is little to evoke responses from the human organism. A well equipped school building may make school life happier, cleaner, healthier, but it is not likely to make the children learn more.

It is not here intended to minimize the importance of good school buildings. The schools must be fireproof, there must be plenty of window surface, and an adequate supply of blackboards and drinking fountains. These things the laws of health demand. On the other hand, there is a tendency to think that a school system which is equipped with a splendid group of new buildings is a model school system. Admirable as such a condition of affairs is, nevertheless, as school buildings do not directly affect the children's organisms they are instruments of administration of schools, not factors in the learning process.

There is such a deep-rooted feeling that education must go on between four walls that it might not be out of place to point out that, in all probability, the school grounds may be more potent in determining the learning process than the school building. Here at least is the earth, which holds infinite possibilities in the way of gardening. There is free space for games, and much literary material in the way of sermons in stones even in the absence of running brooks. At least one group of children in the city of Battle Creek found that Sherwood forest lay among some shrubbery across the street, and the writer has seen school children act Stuart Walker's *Six Who Pass While the Lentils Boil*, outdoors under three oaks.

The schoolroom. By the schoolroom is here meant the schoolroom and its equipment, for there is little in the four walls themselves, except perhaps the distances they are apart, which affects the responses of the child. The equipment of the room, however, has great significance. A pencil and paper are enough to stimulate writing. A little boy of eleven said to me the other day, "I would like to show you a story I wrote in school."

"Did you write it for the teacher?"

"Oh, no!" he replied, "I wrote it when the teacher wasn't looking."

A crayon or a box of water colors will evoke drawing or painting responses. A picture may awaken activity of the mind, a sand table activity of the fingers. The schoolroom well stocked with material which may educe right responses from children is an ideal schoolroom for the progress of learning.

In a similar way the barren schoolroom may be a cause of disorder. The boy who must sit for an hour with nothing to stir him to action but a pencil and paper and a series of unappealing problems soon reacts by tearing up the paper and making spitballs. The materials at hand are sufficient to awaken him to activity but the activity is an undesirable one. Similarly in moments of idleness children may be betrayed by the natural workings of their surroundings into needless and disturbing whispering, hair-pulling, desk-carving or the thousand and one undesirable things which the ingenious boy or girl may discover to while away the time.

Libraries, laboratories, and supplementary rooms. But the schoolroom alone cannot supply, within its narrow limits, all the stimulus which is needed in school teaching. The library is a gold mine which the intelligent teacher works to the full. It is needless to expatiate upon

the importance of books. It might not be superfluous to point out that one of the best qualities a book can have is to attract readers to itself. The more powerful it is in this respect, the more valuable, other things being equal, it is to the teacher. But a library full of good juveniles is sufficient to induce any normal child to read *something*, and so becomes a valuable resource to the teacher.

The gymnasium provides many stimuli to the play responses. It is a question, however, whether or not a gymnasium can be considered as anything but a very expensive indoor playground. Whether or not the benefits of shelter and compactness which it affords outbalance the confinement indoors which it involves, is an open question. The activities of the boy and girl scouts, most of which are outdoor affairs, have much to be said in their favor when set over against customary gymnasium work. At any rate, a gymnasium certainly bestirs boys and girls without much pressure from the teacher.

Laboratories or science rooms are a useful adjunct to the regular schoolroom. Electrical apparatus and material act as a silent invitation. The writer has seen a set of stuffed birds used in the Francis Parker School in the University of Chicago as the basis of a half-hour lesson in bird study, during which the teacher did practically no talking whatever. The carpentry room is a very attractive place, although the ordinary schoolroom ought to be equipped with a certain number of handy tools. So the presence in the school of laboratories and special rooms may make the environment of the school much more effective.

The other children. A part of the total environment which surrounds the child in the schoolroom is the other children. The relationships which exist between children

are very definite and real. Approval of a group of school-mates will induce a boy or girl to perform tasks which he would otherwise shirk. Scorn from the same children would cause him to inhibit almost any response. One of the most valuable assets which the teacher has in awakening children to useful activities is the presence of the remainder of the schoolroom group.

The teacher. The teacher who truly conceives himself as a part of the environment of the schoolroom has gone a long way toward solving the problems of teaching. If the teacher can get away from an idea of the child as a passive thing to be stuffed, or filled by an active teacher, she will do well. If she can go further and consider the child as an active thing and herself as a more or less passive part of the environment, she will do still better. One might almost go so far as to say that the more the teacher is active *in the child's own learning process* the less the child learns, the more the teacher falls into the background and becomes a mere stimulus and guide the more the child learns. Too many teachers educate themselves at the expense of their pupils. The child learns by its own activity, not by that of the teacher. But the teacher has a manner and a smile that the child wishes to imitate, she has a store of ideas which may enrich his own in time of need, she has a knack of doing things which he wishes to learn, she has a power over the universe which he wishes to acquire. Because of her opportunity to arrange situations the well trained teacher is the most important single factor in the school environment.

The characteristics of a good environment. From the foregoing it may readily be understood that a good environment is one that is full of elements which stimulate right action and that lacks elements which stimulate

wrong action. In more ordinary terms this is about the same thing as saying that an individual should be surrounded with many good influences and protected from evil ones. It is in unconscious obedience to this idea that the baby's busy parent surrounds him with rattles, dolls, toys, old magazines and so on and then abandons him in the middle of the floor. The child reacts to the numerous stimuli, as long as there is sufficient variation. It does not react to the stimulus of the parent's presence by such undesirable behavior as crying-to-be-carried and so on. The environment has been so arranged that numerous stimuli to right action have been provided and stimuli to wrong removed.

A further example may indicate the way in which the instinct of a great teacher is to take precautions to protect those under his care from stimuli to wrong or undesirable conduct. Stableton relates a case of tactful protection of a boy under his care.²

Just after the close of school in June that year, one of our leading merchants called me on the phone and said: "Omar G—— has applied to me for a position in our store, and has referred me to you for a recommendation. We need a boy. Is he one for us to take? Will you recommend him to us?"

I replied: "I would like very much for you to take Omar into your employ, but before you take him, I wish to have a talk with you about him; though you *must* give him the place."

He then said: "I'll come to your office right away, if you can talk with me now?"

I replied: "Come on. I'll talk with you."

When he came, I said to him that while I recommended Omar to him and was very anxious for him to give the boy a place, still I felt that for the boy's sake and for his sake he

²J. K. Stableton, *Your Problems and Mine* (Public School Publishing Co., 1922), p. 98.

must know the boy as I had come to know him by having him in school five years. I then told him all I knew about the boy, including the taking of the property of another scholar; and said that I believed the boy would prove honest; but that I would rather he would refuse Omar a place than for him to put him where he would continually be tempted by handling money so loosely that no one could call him to account definitely at the close of each day for every penny that passed through his hands; that with careful guarding for a year or two he would make an honest, trustworthy man, but that by being placed where he would be tempted too strongly at that time, he might, little by little, fall into the habit of dishonesty.

These cases, and other like ones, and my belief that a boy ought not to be tempted at this unsettled time of life by being placed where there is too great responsibility, or where he handles money in a somewhat loose way, except under the very closest, most careful supervision, made me feel that I would rather Omar would fail of appointment to a place in this store than to see him put where he would be too strongly tempted to take what did not belong to him. How often the sight of means to do ill deeds makes ill deeds done is especially true of some boys.

Omar was given the position in the store under the best of conditions. That was eight or nine years ago. He has made good, and to-day stands high with the firm.

The rich environment. The positive side of this doctrine that the environment should be so arranged that it may be able to stir children to right conduct throws light on the meaning of the educational phrase "a rich environment." Much has been said as to the importance of providing the child with a rich environment. This is the same thing as saying that the child should be surrounded with an environment rich in stimuli to right action. The bare walls of the rural school do not serve as an educational background to compare with that provided by a room that is well equipped. The child who exists on a thin fare of reading, writing, and arithmetic

can never develop as the child who is also surrounded by natural objects, by live pets, by music, by beautiful pictures, by many stories interpreted by a cultured teacher. When such an environment as this is provided there are few moments when there is not something worth while to engage the child's attention and invite his activity.

The natural environment. Not only should the environment be a rich one, but it should also be a natural one. By natural is meant like nature; similar to the type of environment which nature provides. This is not the doctrine that nature is right but that nature is very often right, and wherein she is right she should be followed. There is a notable correspondence between the play impulses of the child and the provision which nature makes for their awakening and satisfaction. Children naturally, without instruction, build their harbors and castles of sand, daub out their mud pies, climb trees, pick flowers, run and play games. The children of the Indian did all these things before a white man ever set foot on this continent. Furthermore, in providing these natural objects nature is right, inasmuch as she provides the material by means of which the play tendencies may grow into the ways of a man. Consequently the child in school should not be deprived of his natural birthright.

It may be objected that the boy or girl has plenty of time for these things outside of school hours. The question follows, *What then may be substituted for these things in school which will be better than they?* Is it better to put those things in the school environment which will call forth the child's activity themselves, or to poke the child to work? Is it not better to bring the child outdoors, to hold school in the open air when

possible, to bring the outdoors into the schoolroom, to bring him in touch with birds' nests, and live things, lizards, snails, and snakes? The ordinary school environment may be infinitely enriched by the gifts which nature has given us.

An environment related to the child's experience. An environment in which a child may live and learn should be related to its own level of experience. The doctrine of apperception helps us to realize that our new experiences grow out of our old ones. To attempt to relate a child to an entirely foreign environment can never be successful.

Mrs. Mitchell³ has very carefully worked out this idea as it relates to literature which is suitable for children. She points out that children are interested in those stories which make contacts with their own experience. The very young child is interested in his own fingers and toes, in moving things, and colored things. His stories should be related to these things. A story to be suitable for children of a given age should be composed of experiences which are familiar to them and should use these experiences to carry them farther along the road of analyzing and knowing the world they live in.

A child responds to those elements of the environment to which he has previously responded or to which he instinctively responds, and to elements which are like them. Children's learning and instinctive responses are made to a world of stories, of dolls, of toys, of lullabies and folk tunes, of nursery rhymes, cats and dogs. If the schoolroom makes a direct break from these familiar

³L. S. Mitchell, *Here and Now Story Book* (E. P. Dutton & Co., 1921).

things, what is there in the environment which will call forth responses? An environment which contains factors which are related to instinctive and learned responses will be a valuable one.

A social environment. Since in this world we all have more or less to do with people the environment in which learning goes on should be a social one; that is to say, it should contain individuals and groups of individuals. Human relationships are not instinctively understood but are things to be learned. For instance one is not born to an understanding of property rights. The human being is probably born predatory rather than honest. He must learn not to take the goods of others. Neither is group life instinctively understood. In all probability an individual is not by nature peaceful, neither is he naturally disposed to coöperation. The child must be given an opportunity to sound out human relationships by living in the presence of other children.

Just here may be found a good illustration of the way in which the child world may be different from the grown-up world yet contain many elements which will later on mature into the ways of adults. A group of children is not the same thing as a group of grown-ups. The children are smaller, their ways of action, their interests, their abilities are different. Nevertheless to get along well together they should be peaceful, mutually helpful, sympathetic; all these things are true in common with the life of the larger world.

Social needs may be elements of an environment. The suffering or grief of another should awaken sympathy, the burdens of another should stimulate to helpfulness, the common tasks of the world should awaken a spirit of coöperation. If children do not learn to respond to such needs in their world, how shall they respond to

them later on? One must live in the group to learn the responsibilities and ways of the group.

An environment of direct stimuli. A distinction may be made between a direct environmental stimulus and an indirect one. A person may respond directly to a certain part of the environment or he may respond via another element. For example, primary-grade teachers have often written the number combinations on the board in red or yellow chalk in order the more readily to cause attention to them. Under such circumstances the responses which the children make are not *directly* to the number combination 2 and 2 but *indirectly* via the responses to colored chalk.

A direct stimulus is one which without any intervening elements awakens the response which the teacher wants. When a boy responds of his own accord to a book lying on the table by picking it up and reading it, he makes a direct response. When he is informed that he must read it for an examination in English he responds via the necessity of examination. Thus the examination, not the story, becomes the stimulus. Such is an indirect stimulus; one which awakens the response the teacher wants via the interposition of some other response.

It is to be noted that what the individual learns in one case is not the same as what he learns in the other. When the stimulus was direct, the boy learned to respond to a book by reading it. In the case of the indirect stimulus the boy learned to respond to examinations by reading a book. In the one case he learns to read a book for its own sake, in the other he does not learn to read a book for its own sake. Obviously the learning from the direct stimulus is the desired one.

The indirect stimulus has been much used in kinder-

garten and primary teaching. Children are taught their number work by means of ill-devised and unnatural games.⁴ Thus they must do their number work if they wish to play the game. While this process may be very valuable in order to motivate such work the question arises as to whether or not work to which the organism does not respond directly is suitable work for the individual concerned. If there is not true motivation for number work from the desire to measure or from the desire to perfect one's self by drill for the necessities of use, is the child yet sufficiently developed to learn number work? The old Froebelian kindergarten contained numerous devices which were prepared artificially to awaken responses of a certain uniform kind. Thus children's attention could be fastened on certain interesting blocks, or beads, or colored paper long enough for the teacher to put them through a series of imitative responses, which were made because the teacher asked them, not because of any relation which the child realized between itself and the materials.

When an individual responds directly to a stimulus, he responds to a real situation, when he responds indirectly, via some device, he responds to an artificial situation. But life is not composed of artificial situations. There will be no beneficent teacher to follow a person through life and arrange things so that some artificial circumstance will coax him into action. Consequently one should learn to react directly toward mathematics which needs to be done not via some secondary motive, such as pleasing his mother or his teacher. The child should learn when opportunity affords to respond di-

⁴Reference is not made here to the natural games which involve numbers, as these are one of the best forms of motivation for number work.

rectly by listening with pleasure to the music of the great composers, otherwise the man may find himself forced to attend a symphony concert to keep his wife company.

Thus an environment which abounds in direct stimuli is very important in shaping habits or response to real life situations. The more one learns to react to a thing in virtue of its true nature rather than on account of some accompanying circumstance the better equipped one is for life. If a child in school is surrounded by objects, situations, or ideas which appeal to him by virtue of their very essence, his environment is so much the better.

Concrete cases of good environment. Perhaps a concrete case of an environmental situation of educative value might make the previous discussion clearer.

It has been the custom of the writer during the past two or three summers to do considerable typing on the verandah of his home. On almost any fine sunny day he has been fortunate enough to have certain young visitors who entertain themselves in various ways. Sometimes the youngsters busy themselves with books, sometimes in playing croquet. In the intervals of the typing they coax for stories. Especially are they pleased with those which the writer sometimes composes for their particular entertainment.

But in its moments of idleness the typewriter itself seems to have that particular charm in which it is never failing for small boys. Consequently the spur to composition becomes extraordinarily strong. Heber, one of the most faithful of the visitors, has made several attempts in story form. The latest is presented here as an example of what a *pure twelve-year-old impulse* may result in. It is to be noted that neither this, nor any

other piece of writing done under similar circumstances has even been suggested in a general way by word of mouth. It is a direct, unsuggested reaction to environmental conditions. The story is given exactly as written except for obvious errors in typing, no changes in punctuation, spelling, or paragraphing being made.

THE TREASURE OF WONG TSAI

By Heber Bullock

Suddenly the sound of a scuffle was heard in one of the alleys and Harry turned and rushed to the scene of action.

But first let me tell you about our hero. He was tall and fair and certainly had any amount of strength.

At the sound of footsteps there was a scurry and all he had to face was a big and burly ruffian who was fighting a poor Chinaman.

Chinaman though he was Harry felt it was his duty to help him and he said, "Come out here and fight someone your own size and strength."

The ruffian turned and said or rather growled, "Alright you young whelp, I'll flail you and then finish the chink."

"I'm agreed," said Harry, "Come on."

The ruffian turned and rushed towards Harry and of course all he had to do was to sidestep and give the brute a nice blow on the chin followed by another on the solarplexus which aroused the man to a frenzy.

He rushed at Harry again and Harry only had to do the same thing a blow in the wind followed by a nasty jab in his kidneys.

The ruffian went down like a poleaxed bull. He lay there for a time and then got up and slunk away muttering some imprecations against Harry that I would not like to write here.

The chinaman got up and thanked Harry and told him that he was the bearer of news to the customs officials about a shipment of contraband that some local smugglers had planned on landing that night in a very secluded harbour, which would be very useful to both the customs officials and the smugglers,

therefore he said to Harry that was the reason of the attack on him. In return for what Harry had done for him, he gave Harry a piece of paper with directions for finding a treasure. When he had gone Harry looked at the chart and what do you think he saw, why . . . just a plan of the tenement houses in a certain court.

On looking more closely at the chart he saw that in one of the houses there had been marked an oblong shaped figure with a circle in the middle.

After thinking for some time he remembered that the house was that of a friend of his and he thought "He little knows what a treasure is buried under his floor, but as a friend I think he would let me dig for it in fact I'm sure of it. So the next morning he went down and asked him if he would let him dig there. The friend was only too glad and asked for a small consideration of the result. Harry agreed and at once set to work at the digging.

The result of half an hour's digging was to unearth a small tin box which was wrapped up in a piece of oilskin. Harry undid the oilskin and opened the box. In it he found a map of an island in the South Pacific in the lat. and long. of 28 S. Lat. 141 W. Long. Harry wondered how he could get there when the very question that he was worrying over was asked him by the Russian, his friend. "I don't know," replied Harry, "I have not the faintest idea."

Then said the Russian, I know where you can get a boat." "Where," said Harry "My friend the smuggler." "Who is he asked Harry Is he tall and dark and fairly thickset?" "Yes," said the Russian who we may call Godinsky "He is." "Oh" said Harry "Why I fought him yesterday in the alley. I found him tackling a Chink who was about two or three sizes too small for fairness. In return for what I did he gave me a chart and that is how I came to know of the map here under your floor. It was Godinsky's turn to say "Oh." Then he laughed and said "Wouldn't he be sore if he knew that you, of all people got the chart that he tried to get." I don't think that he was after the chart, said Harry "I think he was after a paper that the Chinaman carried that contained news of a shipment of goods that your friend was planning on bringing into port somewhere along the shore "Uh-huh said the Russian

"Then he doesn't know about the chart at all I expect." But bless you he wouldn't bear malice against you for he certainly can see the fairness of your interruption. "What made him say such things as he did against me?" "His nature" replied Godinsky "He was ever hot-headed at times when annoyed," Who is that cried Harry" at the sound of footsteps "Wait and see" said Godinsky. "Come in said Godinsky at the knock. The door opened and in stalked the smuggler whom Harry had attacked in the alley the night before. "At the sight of Harry his face clouded and he made the motions of choking a person, then he smiled and turned to Godinsky.

"Well how are you friend" "I have not seen you for a long time, when are you going to move" As soon as I can get a place to live in. Where do you expect to go? Do you know yet? No. To tell you the truth I don't think he will forget me when he comes back." No sir I most assuredly won't. Have you got a ship, asked the smuggler, "No" said Harry "I haven't" "then how are you going to get off if you have no ship" I was going to ask someone to let me. . . .

[The situation was such as to prevent the completion of the story.]

It does not take much familiarity with the usual composition product of the ordinary school to make one believe that the quality of this twelve-year-old, public-school boy's story is superior to that of his school compositions.

It might prove interesting to consider the extent to which the environmental conditions which stimulated the writing of this piece fulfill the specifications previously suggested for a good environment. There were abundant stimuli to right but few to wrong action. The environment might be considered a rich one inasmuch as there were many things in the surroundings which might prove interesting to do. There were croquet, storybooks of a suitable kind, stamp books, possibilities of conversation, stories to be read or told and several other things

besides the typewriter and the paper. Intellectually it was rich with suggestion for the boy was used to seeing stories written on the typewriter and then read aloud to himself and his friends when finished. He was sure of an appreciative ear when the story was finished and he knew from experience that there would be no uninvited criticism. The environment was natural inasmuch as it was outdoors immediately adjacent to the lawn and the garden with birds, flowers, insects, and so on. It was also natural for other reasons, for instance because boys are naturally attracted by children's books, croquet, company of other children, any mechanical device, such as typewriter. It was related to the child's experience because it was largely in his own terms, the books were children's books, croquet is a familiar game, other children are the proper kind of company, a typewriter or any such mechanical device, is interesting to boys especially when it can further their own ends. The environment was social because there were other people present. The stimuli were direct for there were no artificial attempts made to awaken action, what was done was done in virtue of a real life situation. Thus, the conditions might be said to fulfill, to a certain extent, the requirements of a good environment.

It may be said that this example has been taken from life outside the school. Unfortunately, such situations are more frequently found outside the school than within it. It cannot, however, be claimed that such conditions may not prevail in the school for there are many schools where they are to be discovered. These conditions are closely approximated, for instance, in such schools as the Horace Mann Elementary School in New York, where the lesson described in the following took place.

The lesson which is referred to was a reading lesson in the third grade. At the proper signal the children gave up their various occupations, began to arrange their chairs in a circle, and took their seats. The teacher retired to the other side of the room and busied herself with some matters of her own. The lesson went on under the guidance of a little girl who had been elected president for the day. She called on the children to read, stopped them if they had not mastered what they were reading or had not prepared to read something of general interest. The children criticized one another's reading and the lesson was carried through to completion. Each child read from material selected beforehand, sometimes his own composition. The lack of formality was evident in the fact that each child had his own reading material rather than a text in use by all. The selection of the day's president had been made earlier in the morning when the day's work had been planned. The teacher was not interrupted during the whole lesson, but she was there to be called upon if needed. She would not, however, be so reserved on all such occasions nor throughout many of the other school activities.

It is not difficult to recognize that the actions of the children in such a lesson are directly to their surrounding circumstances. Here is a schoolroom situation which is spontaneous and vital. The environmental stage having been set, the play goes on.

The relation of the teacher to the school environment. What then is the relation of the teacher to the matter under discussion? It is one of the primary functions of the teacher to arrange a good environment. The teacher who is able to surround her pupils with potent stimuli to right action has won one of the most significant battles of the teaching process.

This chapter has attempted to point out that the environment sets off responses directly without any interposing people or things. Thus if the teacher is able to surround the children with a physical, intellectual, and moral environment which will prompt them to right action one of the fundamental requirements of teaching has been fulfilled. The teacher should regard this as a direct task to be accomplished. Rather than working directly on children she should deliberately and energetically work on situations and allow them to work on children. The teacher who is able to prepare for her pupils a good environment will find out that the problem of the vitalized school has been solved. No longer must she prod her children to their tasks. They will carry them out with vigor and zeal which can only come from whole-hearted interest. Furthermore, if the environment is like the outside world, the children in responding to it are learning to live.

PROBLEMS FOR CLASS DISCUSSION

1. Some children in a progressive school, where they were more than usually happy, and contented, were asked what they liked about their school. The following obviously honest answers were given by the pupils: "I like the multiplication table" (just learned). "I like my arithmetic." "I like to read the stories in my books." "I like my work."

Discuss this school as an environment of direct stimuli.

2. Harold is a boy of nine, whose parents are both artists. He was early provided with canvas, brushes, and colors, but given no instruction in painting. He has painted numerous pictures all showing genuine merit. Discuss this case in the light of the educative value of the rich environment.

3. Creighton, aged eleven, became very restless during a tent performance of "Barnum and Bailey's Circus." He showed many signs of discomfort, became disagreeable and petulant, and insisted on leaving the circus, which he had been eager

to see, early in the performance. (He denied sickness and would give no reason.) Should he have had his way? The child was taken from the circus and soon regained his natural smooth disposition. Later inquiry revealed that his hand, suffering an annual eruption from ivy poisoning, had itched beyond endurance in the excessive heat of the tent. The outdoor coolness had brought almost immediate relief. Discuss environmental factors in this case.

4. Alfred, a city boy, dives beautifully from a fifty-foot ladder into the mineral baths in the neighborhood. He is very nimble, dives well and frequently. His father is a trainer in physical work. Discuss the proximity of the mineral pool to his home as a factor in the environment. Other factors?

5. If a child be provided with a rich environment may he be wisely left without a teacher part of the time? All the time?

OUT-OF-CLASS ACTIVITIES

1. Write a list of some important learnings you gained without a teacher. In which would a good teacher have made a difference?

2. Watch a small child playing. Observe his direct responses to the environment. Introduce into the environment several new factors to which he is likely to respond, but do so silently.

3. When entering a room in which there is a child pay no attention to it whatever and see what happens. Do not tease the child by prolonging the situation. What deductions are you able to make from what happens?

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CHAPTER IV

THE TEACHER AS A GUIDE

It has been pointed out that the presence of certain elements in the environment is enough to draw forth responses. But the provision of environment cannot be the ending of the teaching process. Not every response which a child makes is of equal importance or of equal value. For example, it is not difficult to induce a boy to play ball. In fact, the presence of a ball and a friend is all that is necessary. Neither is playing ball anything in itself wrong or undesirable, but nevertheless it is not related directly to many things that the teacher wishes to have done in school. The same boy may be easily induced to make a sailboat, but such an act, if unrelated to other activities, has little value for the school. It is not enough for the teacher to awaken responses, but she must also select from those which occur the ones that are to the purpose. She must guide and lead the responses in definite ways.

A teacher should be skillful in choosing from the numerous responses which a child makes those which are of value for the life of the school. For example, in the kindergarten story circle one child offers to repeat a story which it has told many times before, another offers a new story, and Jack, an especially shy child, offers the same oft-repeated tale that George has just finished telling. Here are a number of responses; which one shall the teacher choose? She chooses the one most

valuable for the life of the group. Without refusing the other two she calls on Jack for his story, because she knows she must seize his response while the opportunity is at hand. Again, a girl interrupts her work on a problem to help a neighbor who has upset a pile of books. Shall this response be reproved, ignored, or approved? Whatever course the teacher takes will have some effect on the children concerned. As the teacher chooses so the child grows.

Children frequently do certain things which may be turned to the definite advantage of the school. Boys and girls frequently bring precious objects, alive or dead, to school to show the teacher and the scholars. Suppose that on a certain day James brings with him a pedometer. Here is a golden opportunity for the teacher who happens to be waiting to awaken interest in certain processes of arithmetic. It will take little suggestion to stimulate the pupils to a desire to find the length of their own average stride; in fact, the necessity for division is evident. Thus may one of the random responses of the children be selected according to the purposes of the teacher.

Not only may the teacher select from among many responses, however, but she may lead the responses which the children make into channels which might at first seem very foreign. The boy who makes a sailboat will find it but a brief step to Nelson's battleship at Trafalgar, and so is opened up a field of history which before might have been comparatively nonsignificant. A newspaper clipping on the Panama Canal might introduce the geography of Central America, a series of health problems, or a vital problem in costs of construction, according to the intention of the teacher. Thus may the natural impulses of the pupils be turned

to good account and capitalized for the good of the school.

In still another important way may the teacher pick and choose from the reactions of the children. The power of the teacher to accept or reject responses by the attachment of satisfiers or annoyers is infinite. If the wrong act is followed by disapproval, either of the teacher or of the other members of the group, it is much less likely to be repeated. Thus if the speaker, who does not talk loud enough to be heard, is informed by one of the listeners of the fact, improvement will probably result. If the slow pupil is made conscious of his gains, he is rewarded for his labors. This application of the law of effect is very useful in the classroom as it is in the control of all human conduct.

The teacher does not prepare an environment of a suitable kind and then sit by in idleness to watch the result of the experiment. She is ever at hand to select the right response and reject the wrong one, to correct an error or to give help in time of need. The young student of music, for instance, may strike a wrong note on the piano and continue entirely unconscious of the error until it is pointed out by the teacher, who thus indicates the note that is to be rejected. A certain sentence may prove unintelligible because of a Latin phrase beyond the ken of the reader. An appeal to the teacher secures (we hope) the enlightening translation. Thus by pointing out mistakes and helping where a child can not help himself the teacher is an indispensable companion.

The value of the teacher's help is very clear when one considers the way in which supervised study is carried on. The students are engaged in working at their seats. The teacher is present as a consulting expert. Suppose that a student, after attempting to solve a

geometry exercise, appeals to the teacher for assistance. The teacher may draw his attention to a pair of adjacent angles which he has not observed, or to some other part of the whole which has escaped his notice. This will probably be sufficient to enable him to solve the problem.

What is it exactly that the teacher has done? The student in attempting to solve the geometry exercise has reacted in several ways to the elements of the problem which he has been able to recognize, but the problem is not solved. Without the teacher he would be unable to go on. He calls for help, and the teacher reveals an element of the environment which has hitherto escaped his attention. Reacting to this he solves the problem. The teacher has revealed a hidden element in the environment.

Directing study. It is thus not difficult to understand how it has come about that the teaching process has been recently conceived of, especially in secondary-school teaching, as directing study. If the reaction between the individual and his environment be regarded as *study* then the teacher's selection of responses, her leading of responses forward to other responses, her corrections and assistance may be thought of as *directing* the school work.

Miller¹ gives an example of the working of this method in the conduct of a lesson in grammar. The lesson dealt with the recognition of the complete *subject* and *predicate*. It was carried on in a seventh-grade class.

Ten sentences were worked out in this class. Each pupil marked complete subject and predicate on his own paper, working individually, and came to the teacher, or to the class

¹ H. L. Miller, *Directing Study* (Charles Scribner's Sons, 1922), p. 137.

helpers, when assistance was needed. The numbers refer to the sentences with which the pupils had difficulty. In most cases the pupils made no answer, but simply went back to their seats and corrected their mistakes. Before the end of the hour all had marked all the sentences without error, and had their papers O.K.'d by the teacher.

The sentences used were as follows:

Underline with one line the complete subject, with two lines the complete predicate, in the following:

1. After the theatre we drove home.
2. Down he went on all fours.
3. Quick as a flash the blow fell.
4. "Aye, Aye," answered the sailor.
5. A worse trip they had never taken.
6. Lost in the wilderness the children wandered for hours.
7. Not every one could make as good a speech as that.
8. Here comes the teacher!
9. The principal had called Lucy's mother to a conference.
10. We had had a delightful picnic after all.

The following responses indicate the character of the procedure employed in directing these pupils at work:

HELEN:

3. [Pupil's question.] Would you put *the* with *blow*? [He continues.] Oh, yes, it tells *which blow*.
10. [Pupil's question.] *Had had*. What is that supposed to be?
6. What does *lost in the wilderness* modify? [I had to ask this question a dozen times.]
7. Does *not* modify *could make* or *every one*? [I think myself that this could perhaps be construed in two ways.]
1. What does *after the theater* modify?
9. *Lucy's mother* tells *whom* he called.
[This pupil had the subject right.] We call that the? Do you know whether it belongs to the subject or the verb?
9. Is *Lucy's mother* the subject? Does it belong to the subject?
7. *As good a speech* tells? You call that?
5. *Worse trip* tells? Cover it up and see what you need to know in the sentence; then uncover it and see whether that tells you what to do.

3. Does *quick as a flash* tell about the blow? What does it tell?
9. This is wrong. I think you can tell what is wrong with it.

Following is a report of one of four pupils who got their papers O.K.'d early in the hour, and who were permitted to help other pupils by asking questions never by telling. These pupils noted down the questions they asked, and, in some cases, the answers:

3. Why would *quick as a flash* modify *blow*? Then what would it modify?
2. What did he do?
3. Why would *quick as a flash* be the subject? What did it do? What does *quick as a flash* modify?
5. What did a *worse trip* do?
6. What did the children do? What does *lost in the wilderness* modify?
7. What is the subject? Why would *as good a speech* be the subject? What did every one do?

This conception of teaching as directing study is a very valuable one. The pupil is confronted by a challenge to action. He takes up his work and proceeds through it up to a certain point. But his experience of life is deficient, he has not made the complete set of adjustments toward life that the teacher has made. Out of her richer experience she is able to draw forth what will be of assistance and so the gap is bridged.

The curriculum. It has been pointed out that the teacher acts as a leader, seizing upon a given response, such as the making of a sailboat, and leading forward such responses into the field of history, geography, or the like. The question arises as to how the teacher can know exactly what is the material to which she wishes her scholars to react. Will it do for children to learn just anything at all so long as what they learn seems to be something profitable? Is the teacher to be satisfied with whatever reactions the child makes? Shall she ac-

cept whatever the child wishes as pure gold? Is she to be guided by his impulses and desires?

There is popular misconception which regards the tendencies of the child as sacred. It is thought that whatever the child initiates should be carefully fostered and assisted in the interests of his fullest self-development. The teacher thus becomes the child's servant and is merely present to study his desires and to wait upon him.

Such a point of view is dangerous in the extreme. A teacher of worth knows within rather definite limits what she wishes the child to do. Her problem is to induce the child to do such things rather than certain other comparatively useless things. The teacher who does not know what she wishes her pupils to do is worse than useless. The good teacher is one who knows what reactions she wishes to secure. She places the child in situations which will make him want to do those things, instead of making him do them because he is so commanded.

The teacher has a definite guide as to what series of responses she wishes to awaken in what is called the curriculum. It is the curriculum which embodies the teacher's notions of what she wishes her pupils to do. The curriculum is a series of experiences which the teacher believes is essential to the pupils in her care. It is her duty to guide the children through these experiences in order that their lives may be enriched by the values they contain.

A quotation from the printed curriculum of the Horace Mann Elementary School² will make the point clearer.

² Horace Mann Elementary School Curriculum, 1917, pp. 110 and 111.

SIXTH GRADE

The work of the boys and girls in this grade is separate, that of the boys being done in the shop and that of the girls in the sewing and cooking rooms.

Boys

The work is designed to be informative and manipulative in connection with the wood and metal industries as far as is possible within the limits of the time given—one hour each week. Contact with these industries is had through the projects made by the pupils.

The main project is a sheet-metal motor boat of the round bottom type. The hull is of tin plate shaped by folding and pounding over a wood form and soldered at bow and stern. The wood form is built up of laminations marked out and cut by the pupils from patterns furnished them. These pieces are nailed together and their edges shaved down to make a symmetrical hull.

The boat is equipped with an electric motor and a battery of two regular number six dry cells in series. The propeller is made by the pupil and is driven through reduction gears in order to obtain maximum motor speed which affords maximum power together with minimum current consumption. The ultimate gain is long cruising range for the boat. On completion of the boats the interest culminates in a lively contest in the swimming pool where prizes are awarded to the winners.

The other projects worked out are in the nature of copper book ends or small trays or bowls hammered into wood forms.

Industries Represented and Studied:

1. Lumbering industry
2. Iron and steel industry
3. Tin plate industry
4. Copper and brass industry
5. Tin and lead industry
6. Electrical manufacturing
7. Commerce

Aims. In the selection of the projects and in the study of them the end in view is to bring to the pupil:

1. The more important facts concerning those industries represented by the materials used and the projects worked out.

2. Knowledge of and manipulative practice in the common industrial processes.

3. Knowledge of and practice in simple mechanical and electrical construction.

4. Opportunity for expression of that strong interest in boats which is manifest from the earliest grades.

5. Satisfaction of that common desire to create things which may be used.

Girls

The year's work for girls is divided into two parts, one part given to cooking and the other to sewing. The same amount of time is given to this work as to that of the boys, an hour each week. No detailed announcement or outline of plan can be given here as the work is the beginning of an extended study of the household arts continued through the High School.

It may be observed that this section of the curriculum embodies rather definite notions of what the children shall do in school. There is, however, considerable room for variation. It is the work of the teacher to awaken the children to the activities here suggested. The curriculum serves as a guide to what the child should do.

Subject matter of curriculum is comparatively constant but the mold varies. It has been suggested that the curriculum has both its constant and its variable aspects. This is quite true. It should be clearly recognized that the subject matter of the curriculum is a comparatively constant thing. It is not meant by this that the subject matter does not change with changing conceptions of education, but it is meant that in a given school and in a given year the subject matter is a well defined and definite thing.

Take an example from the same course of study just referred to³ on fifth-grade nature study. The curriculum reads.

The bird as an Individual: its structure and life history; structural and color adaptations; habits; nest, eggs and young; food and consequent value to man. Something is learned of all the birds on the following list: English sparrow, starling, grackle, junco, chickadee, nuthatch, brown creeper, song sparrow, red-winged blackbird, robin, bluebird, cedar waxwing, crossbill, meadowlark, kingbird, Baltimore oriole, goldfinch, cardinal, scarlet tanager, indigo bunting, vireo, humming-bird, flicker, downy woodpecker, blue jay, crow, cuckoo, whip-poor-will, purple martin, cliff and barn swallows, a few game-birds, the seagull, an owl, hawk, and heron.

Nothing could be more definite than the subject matter here outlined. The fifth-grade teacher gains from this a very clear picture of the material with which she wishes her pupils to become familiar.

But an extremely variable factor of the curriculum is involved when one considers the way in which the children are to cover this ground. There are many ways in which this work can be taken up. The teacher might simply carry the class through the printed course lecturing on the structure of the bird and so proceed, taking up each topic in order and expecting the children to reproduce the lectures in a notebook. Again she might assign the topics for reports and the class might prepare their work by consulting Chapman's *Handbook of Birds of Eastern North America*,⁴ which contains all the information necessary. The reports might, on the other hand, be prepared in the library. The teacher might use

³Horace Mann Elementary School Curriculum, 1917, p. 85.

⁴Frank M. Chapman, *Handbook of Birds of Eastern North America* (D. Appleton & Co.).

the 106 bird plates published by the University of the State of New York.* She might institute a series of recognition games, using stuffed birds. The class might make trips to the museums and examine the material there. The point of attack might be found in a bird's nest which some one has found. A talk might arise out of a boy's collection of birds' eggs that would lead into the question of bird conservation. A visit to a zoölogical garden or a private aviary might be made. The children might be stimulated to go on private bird walks, especially in the country, the class might be taken out for a bird expedition.

It may thus be seen that the same subject matter may be covered in many different ways. The children might cover the same subject matter by a series of experiences which are very different in different cases. The subject matter of the curriculum may be comparatively constant, but the mold is variable.

The accompanying chart published in the Journal of the National Education Association⁶ serves well to illustrate the way in which the subject matter of the curriculum may be cast into the form of units of life activity. In the section to the left of the black line, under the heading, *means*, are listed the materials or subject matter of the curriculum. In the column to the right of the black line under the heading, *associated activities*, are listed various activities which are of such a nature that their

* Teachers will be interested to know of this excellent set of plates, "Birds of New York," the price of which at present writing is \$1.20, postage paid. In it are pictured many of the birds of Central and Eastern United States. It is to be secured from the University of the State of New York, State Museum, Albany, N. Y.

⁶ Howard R. Driggs, *Journal of the National Education Association*, Vol. 12, No. 4, plate 49.

pursuit will involve the mastery of the subject matter to lead on and up into the "well trained, high-minded, young American."

Herein lies the great opportunity for the teacher. When the same subject matter can be covered in so many different ways it is her opportunity to choose that mode which best suits the present responses of the children and the other present conditions of the teaching process. If a teacher were bound to teach in a given mold in a set form the teaching process would be but a dead thing. When she is continually seeking for the best point of contact between the child's responses and the responses involved in the curriculum, she is presented with a task which is as variable as the changing hues of the sky; which may tax her ingenuity and inventiveness to the utmost.

Miss Linke⁷ found that questions asked by the children themselves could be made a valuable starting point for a series of activities of distinct value covering a wide field of subject matter. The question of one bright second-grade boy of seven. "How do we get silk?" led on to many things. The children of the upper grades were asked to answer the question in chapel. Since the answers did not prove satisfactory, due to lack of preparation, one second-grade child decided to look it up in the *Book of Knowledge*. She did so, consulting the science teacher for further information. After writing a short paper, which she copied voluntarily three times in order to make it legible, she submitted it to the English teacher for correction and then read it before the school. It was entitled "How We Get Silk." In con-

⁷E. A. Linke, "An Experiment in Teaching in Response to Children's Questions," *Teacher College Record*, Vol. 21, p. 555.

nection with it she explained a silk-worm exhibit, procured from the Museum of Natural History by an eighth-grade girl. The teacher of mathematics contributed some raw silk from the yellow cocoon, and afterwards in their own classroom the children examined it, heard about the combing process, and with hand lenses studied the exhibit while the science teacher told them many interesting facts. "The children in the first grade were overjoyed when they deciphered the labels. They attempted to reel the silk, and later begged for strands to take home to show their parents."

These developments were followed by questions on the manufacture of silk. They were taken up and some actual weaving carried on, the weaving produced rugs and the rugs suggested a doll house.

The doll house, of necessity, had to be furnished with something besides rugs, so tools were ordered for making furniture. The children looked at the order book and discussed the best chest to buy. This was ordered, and when it arrived work began.

For the house, two egg crates were fastened together, making four rooms in all. The framework of the room was erected and then work began in earnest. The children divided into groups. Some measured, some sawed; two directed the house construction and had numerous consultations as to the best plan of procedure. Some of the children made wallpaper designs which called for discussion, measuring, observation of home designs, and so forth.

While the children measured, sawed, nailed and papered, they became increasingly careful, through suggestions, that their products be as nearly perfect as possible. These standards became sufficiently generalized and of such interest to the children that they applied them in their other work, such as spelling and writing. The tendency towards efficiency in all other kinds of work was so pronounced that it was remarked upon by those interested in the experiment. Also much in the way of "give and take" was learned in these little contacts.

So may the children's own responses be led and guided into fields that are profitable.

The extreme importance of what the child learns. It is no unimportant or light matter what experiences go to make up the curriculum or the teacher's conception of it. Upon the content of the curriculum depends to a large extent the matter of *what* the child learns. In the determining of this problem lies what is probably the highest and most important task of the teacher. Herein lies the significance of education; it can determine the direction in which the child's activities shall flow.

Of more importance to the teacher than the intelligence of the child is the question of just what he shall learn. This is not due to the fact that intelligence is a negligible factor but to the fact that it is at any given moment a comparatively unmodifiable factor. The teacher must accept it as it is. What the child learns, however, is to a large extent within the control of the teacher. She may permit the child to learn to box the compass, to "shoot craps," or to raise corn. She may lead him to conclude that to make money is the chief good, that worldly wealth is so much spiritual impedimenta, or that he should seek neither poverty nor riches. In thus governing the stream of the learning process the teacher can become a powerful determining force.

The significance of this directive power of the teacher may be pointed by analogy. Suppose that two messengers are dispatched to a military commander with news that is vital to the safety of the army. One travels in a high-power machine, the second is forced to use a slow-moving horse. The high-power motor reaches a point where the roads divide, takes the wrong turning and is soon fifty miles in the wrong direction. The horseman makes the right turning and reaches the objective

just in time. Which of the two messengers proves the most useful, the one which was best equipped for speed or the one that went in the right direction? Which proved the more important determiner, the speed of the traveler or the choice at the crossroads?

This somewhat lurid illustration nevertheless serves to indicate that the channel in which energy flows may be even more important for the general good than the amount of energy concerned. A push in one direction may send a man under the wheels of a train, a push in the other may be his salvation. Which is the more significant in life, the intelligence of the child or the teacher who stands at the crossroads? Fortunately it is not necessary to decide this question. All that needs be pointed out here is that the teacher's power in the training of the individual is enormous.

Misdirected activity. The value of any activity is not determined entirely by the energy involved but also by the form which the activity takes. It is possible that activity shall be misdirected, not merely in gross mechanical ways but in the highest sense. Human energy may be and frequently has been misapplied. Even spiritual energy may flow in the wrong channels. No one would hesitate to believe that the impulses of the early Christian ascetics were spiritual ones, or that their privations were the direct outcome of a passionate love of God. Nevertheless the power of these great spirits was sapped away in unnatural asceticism even in the denial of the family affections and duties.*

For about two centuries, the hideous maceration of the body was regarded as the highest proof of excellence. St. Jerome

* W. E. H. Lecky, *History of European Morals* (D. Appleton & Co.), Vol. 2, p. 107.

declares, with a thrill of admiration, how he had seen a monk, who for thirty years had lived exclusively on a small portion of barley bread and of muddy water; another, who lived in a hole and never ate more than five figs for his daily repast; a third, who cut his hair only on Easter Sunday, who never washed his clothes, who never changed his tunic till it fell to pieces, who starved himself till his eyes grew dim, and his skin "like a pumice stone," and whose merits, shown by these austerities, Homer himself would be unable to recount. For six months, it is said, St. Macarius of Alexandria slept in a marsh, and exposed his body naked to the stings of the venomous flies. He was accustomed to carry about with him eighty pounds of iron. His disciple, St. Eusebius, carried one hundred and fifty pounds of iron, and lived for three years in a dried-up well. St. Sabinus would only eat corn that had become rotten by remaining for a month in water. St. Besarion spent forty days and nights in the middle of the thorn bushes, and for forty years never lay down when he slept—

So also did the Crusaders and the various religious persecutions of history often find their nourishment in what could not but have been pious impulses. From the point of view of the human race spiritual force so consumed has been a tragic loss. So may the strength that is in us be wasted.

Similarly may intellectual energy be dissipated. The greatest minds of the Middle Ages were consumed in following out the intricate logical meanderings of dialectic. For generations upon generations China's life was turned in upon itself and the greatest minds of that marvellous nation were engaged in a recapitulation of the past which held China at a standstill. So we find a miniature parallel in the high-school boy who spends hours upon hours, night upon night looking up Greek or Latin words in a dictionary. Could the teacher of classics guide the energies of the boy into greener pastures? It is the teacher who determines whether or not

much of the human life force of his pupils shall be wasted or conserved.

The criminal or the saint. Not only does the teacher determine whether the human force shall be saved or squandered but she may to a certain extent determine whether it will be used or abused. A person may do right or wrong. The child who lives a wrong life in school will live a wrong life when he leaves school. It is true that the ordinary teacher is somewhat limited in the matter of moral responses. Nevertheless, this is a concern of the teaching process.

The important problem for society is not merely whether or not the schools are turning out people able to do things, but whether they are able and willing to do the right things. A citizen should not merely be a clever man but also a man who can use his cleverness to good ends. A high intelligence may the better equip a man to be an arch criminal. A good teacher may turn a subnormal individual to occupations which are useful to society. So important is the directive function of the teacher.

PROBLEMS FOR CLASS DISCUSSION

1. Discuss the following remark which was made, during a lecture, by Miss Helen Parkhurst—"One of the greatest problems of education is the reconciling of teaching with learning."
2. Compare the guiding function of a teacher during a lecture with that of a teacher actively supervising study of pupils.
3. The following "criteria for judging the worth of a school activity" are suggested by Chapman and Counts.
 - (1) The activity must be one not provided by the out-of-school training.
 - (2) The activity must be within the capacity of the individual.
 - (3) The activity must, as far as is consistent with criterion 4, be of interest to the individual.

- (4) The activity must, with the maximum economy of time, leave behind it, in the form of habits, skills, knowledges, procedures and ideals, powers which will, with a high degree of probability, be employed by the individual in the important activities of his life.

a. With what degree of validity could the following be substituted for criterion (3)—*The activity must, as far as is consistent with criterion (4), be such as to call forth the effort of the individual.*

b. Apply the criteria, one by one, to the following subjects of the curriculum of the secondary school—1. English, 2. Algebra, 3. Civics.

4. Discuss the first of the following passages in the light of the second:

Peter continued to go to school at Dorfli, but now and again he stole a holiday, for he could see no use in learning to read while to wander about a bit and look for stout sticks which might be wanted some day he thought a far better employment.*

When, however, those who champion the retention of a certain study, or the introduction of a new study, are made to assume the burden of proving the extreme likelihood that the activities included in the study will make an obvious and direct contribution to the individual participant when engaging in some important life activity, there will be a distinct step in advance."

5. Discuss the following excerpts from an advertisement in a New York newspaper. "You can get a High School Course in 60 handy volumes for \$2.98 payment in full," "Be your own teacher, 835,000 words of text! 3,488 pages!"

OUT-OF-CLASS ACTIVITIES

1. Study the work of your various teachers and note the devices they use to guide your activities in and out of class.

2. Secure a book on, or visit a school run by the Dalton Laboratory Plan. Consider to what extent the teachers in such schools act as guides to pupil activities, and what devices they use.

* Joanna Spyri, *Heidi* (E. P. Dutton Co.), p. 71.

"Chapman and Counts, *Principles of Education* (Houghton, Mifflin Co.), p. 381.

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several different ways. They may be laid out in a line, parallel to the wall; again, they may be arranged in a column perpendicular to the floor; or they may be strung on a cord supported at either end to hang in a concatenary curve. In whatever form they are set up, however, they are still the same blocks, the difference lies in the fact that they have, in each case, been arranged with reference to some distinct and different organizing plan.

Similarly, ideas may be arranged with reference to some organizing plan. Thus a book might be written setting forth the facts of history so that they would throw light on political development. The same history might be written to indicate social progress, while a book like Wells' *Outline of History* marshals the facts according to some theory of race development. The periods of history are in each case the same, but the facts are organized with reference to some separate chosen principle.

In a similar way, the material of the school curriculum may be arranged with reference to different organizing principles. It is conceivable that the material of the curriculum might be grouped with reference to some new plan of administration, whereby the English teacher took charge of a certain group on Monday, the geography teacher took them on Tuesday, the history teacher on Wednesday, and so on. Again the work might be arranged as in the Laboratory Plan where the children receive a set of assignments covering a period of weeks, and circulate about the school disposing of their time to suit themselves, within the limits imposed by the completion of their work on time. Again school work might be arranged with reference to some idea of the Culture-Epoch Theory of child development, or to

any number of well-considered or hare-brained schemes.

Most of the variant types of schoolroom organization which appear about us on every hand may be loosely classified as those which tend to organize the class work in terms of subject matter or those which tend to organize their work in terms of conduct. It may therefore be well to give some examples of procedure which might be clearly placed in one or another of these categories. Having distinguished the two we may then go on to consider their relationships—the way in which one shades into another. It should always be kept in mind that we are not trying to label one type of organization bad and another good, to regard one type of organization as useless and another useful. Rather, in comparing the two, have we the problem of distinguishing which of two practical and relatively successful methods is the more economical, and which makes the most of the resources at hand.

Organization in terms of subject matter. The subject-matter type of organization is neither primitive nor natural. Its use presupposes the presence of a highly organized and complex type of piled up knowledge. It presupposes the prodigious labors of scholars in the collection and organization of subject matter. Modern scholarship has the benefit of the culture of Greece, the stupendous labors of the Schoolmen of the Middle Ages, and the developed knowledge of modern science. In the presence of such an enormous accretion of subject matter it was inevitable that teachers should tend to become scholars. It was almost as inevitable that these scholar-teachers should attempt to select what they considered the most important subject matter, classify and arrange it logically and pass it on to their students in condensed

and predigested form. It was under the tradition of such teaching that the forerunners of our modern school systems were founded. It is not astonishing, therefore, to discover that the effects of such traditional methods are obvious in our schools to-day. It would not be profitable to outline this development of the subject-matter method more thoroughly at this point. Suffice to say that its influence in the elementary school is obvious in such lessons as the following.

DETAILED PLAN FOR TREATMENT OF PRIMER

Pages 10 to 94

Key Words

For teaching the phonics indicated on each page of the Primer, a word from that page is suggested as a key word, from which to obtain the new sound. It is understood that these key words are to be first taught as whole words. Any other word than the one suggested, if previously taught, may be used. The key words are given in brackets after the phonic elements. The teacher who prefers to develop the phonics without resorting to key words will, of course, not need to use these words.

Teaching notes for each page are arranged as follows:

- a. Phonic elements—key words in brackets.
- b. Words on each page that may be recognized by phonic elements already taught.
- c. All other words on the page.
- d. Additional words that may be built up from the elements taught. The words in brackets are not phonic, but it is suggested that they be taught in this connection.
- e. Lists of sentences for blackboard work. It is not supposed that any teacher will use all the words and sentences in these lists, but will make a selection, enough to ensure that the pupils have mastered the new elements.
- f. Suggestions of a general nature.

Teaching Notes

Page 10:

- a. oo (food), f (feet), d (hand).
- b. Fan, feet, school, food, seed, hand, too, me, she.
- c. have, to, come, her.
- d. too, cool, coop, hoof, hoot, loop, moon, noon, pool, soon, soot, scoop, shoot, spool, spoon, stool, stoop, tooth, loose, school, smooth, foolish. (foot, two)
- e. Nell sat on a stool. Tim lost a tooth. Hal sat on a stool. The hen is in the coop. Sim is at school. It is cool at the school. Nell is on the stoop. She has a hoop. It is cool on the stoop. Nell can see the moon. She can see two moons. The moon is in the pool.

[This plan continues for each page through the Primer.]

It is clear that the above plan for teaching elementary reading is dominated by the subject matter involved. A primer was first prepared by some individual of experience and in it was included subject matter which, according to the judgment of that individual, was desirable and suitable for teaching the early stages of reading to children. It is the subject matter that is particularized, the children are generalized. The beginning point is found in the subject matter. The pages of the primer are analyzed and specific words are dealt with. The teacher makes a survey of the page and uses her judgment in deciding what shall be taught, what bonds need to be formed. Here is little suggestion of any reference to particularized life needs of children. Children are regarded in the mass. Subject matter is the guide of procedure and the teacher tends to dominate the learning process. -

Such lessons are extremely common in schools in all parts of the world and at all levels of teaching, elementary, secondary, and college. They are simple. They

demand no recasting of the subject matter of the curriculum into any new mold. They accept the logical organization which the makers of the curriculum provide ready-made. They demand no effort, no thought, the minimum of planning. They are easy to teach.

Organization in terms of conduct. In recent years several forces have combined to produce a modern trend away from teaching dominated by the subject-matter point of view. There has been, in many quarters, considerable dissatisfaction with the school product. Still more significant, however, has been the growth of the science of education. The development of educational psychology has contributed greatly toward a new understanding of the learning process. Thinkers have been regarding the problems of education and bringing constructive thought to bear upon them. In matters of education the question has taken the place of the answer. It is increasingly realized that teachers, so far from knowing just how children should be taught, do not even know what they should be taught. Less and less emphasis is therefore being placed on subject matter and more and more emphasis on the activity of the learner. There has been a tendency to make the learning process less restricted, less artificial and to return to what may seem more naive, or primitive methods of teaching. This movement is frankly an experimental, a scientific one. It is a search for truth; and in that search it becomes increasingly obvious that the best things in teaching lie in the direction of organization of school life in terms of conduct rather than in terms of subject matter.

An excellent example of a lesson in early reading to set over against the primer lessons just referred to is the following. It is one which the writer was so fortunate as to see taught to small children by Miss La

Forth in the Children's House at Sunnyside, New York. The lesson immediately followed a play period in which the children had been outdoors. When they returned they sat before the blackboard with the teacher. The teacher had selected a sentence from their conversation in the period just preceding the outdoor play. This sentence she wrote on the board in printed script: *We must go out to play now.*

The children were all anxious to read. One was chosen. The youngsters were making comments such as "I can read it." The teacher now wrote: *I can read it.* She talked with them and as they answered and talked to one another the teacher selected suitable sentences from those which they spoke, wrote them on the board and the children read them aloud.

How much money did the crackers cost? the teacher wrote toward the end of the reading lesson. This soon led to a discussion of costs. Mrs. Weinberg, the Director of the Sunnyside Schools, had given the children five dollars to buy crackers for school lunches and some other things. The children had gone out together and made the purchases. The costs were now listed on the board.

Bill	\$1.59
Crackers30
	<hr/> 1.00
	\$2.89
	<hr/> 2.11
	<hr/> 5.00

The children readily added the columns and made the various comments and computations involved. It was obvious that they were learning the good old-fashioned things but not in the good old-fashioned way.

The interest in the reading was so intense and so absorbed were the boys and girls that they stood on tiptoe and leaned forward to catch sight of each word or figure as it was written on the board. The present writer had never previously witnessed such intentness on early school reading material.

It is clear that the logical organization of the subject matter of beginning reading did not control this lesson. Here it was the children who were particularized. The beginning point was found in the responses offered by the students and the course of the conduct that followed was dominated by the nature of the work which the children were determined to accomplish. They were determined to learn what was the meaning of the teacher's written words, especially as those words were really their own. At the same time they were securing mastery over the various reading skills.

Two methods in teaching of languages. The teaching of foreign languages may be dominated either by a formal or a natural method. The writer, who was unfortunate enough to have been taught Latin and Greek by a narrow subject-matter method, had the privilege of studying Chinese by an entirely different system, one based upon conduct. He is thus in a position to compare the two methods of teaching and their results.

The extreme formal teacher of classics begins by telling the students to memorize *tuba*, *tubae*, *tubae*, etc. To callow adolescents, scarcely aware that Latin is a language and not merely a subject, this list is meaningless jargon. Students who have begun in this way are likely to find that Latin is a vocabulary, a set of declensions and conjugations, a series of rules. The words are to be modified according to the declensions and conjugations and then placed in sentences according to

the rules. Since the sentences in the Latin texts are in English, they are already clearly understood. The translation into Latin thus becomes a scheme not to communicate, but to obscure thought. Such an example is doubtless an extreme case of formal teaching, for such methods fortunately are passing out of use.

In the school in which the writer studied Chinese in Peking the communication of ideas was basic to the teaching. The teachers, who were Chinese, could not speak English. Consequently, in the beginning, the teacher selected a word of Chinese which would immediately convey an idea.

Pointing to himself, the teacher said "Wo." Pointing to another, he addressed him as "ni." Then, talking to one student, he indicated another and said "ta." It demanded little acumen to realize that the words were the pronouns in Chinese. A small vocabulary was introduced gradually and was used in communication. The students, after a week or two of hearing, went to other teachers and in conversation with them used their new found power to communicate by talking with them. After several weeks it was possible to chat with considerable freedom. In a few months the writer learned to get about freely and talk with the Chinese people. As for Latin and Greek, however, although he studied them for years, he is to-day unable to speak a sentence or to read a single page.

Two ways of teaching literature. The following quotation will illustrate how the teaching of literature may be colored by a subject-matter or a conduct-unit conception of teaching.¹

¹ E. Yeomans, *Shackled Youth* (Atlantic Monthly Press, 1921), p. 80.

"The class will please take their readers and turn to page 43. John, what is the subject of the story on that page?"

"Now, stand up and read till I tell you to stop; stand up straight, please, and hold your book in your right hand. Speak clearly, hold your head up. There—that's the first sentence; now tell us what mood the verb is in. What is the rule for the subjunctive mood? Can't anybody remember that? Why, we had it just day before yesterday. I will write it on the board; for that is something which you must know before you go on to the next grade."

She writes: *The subjunctive mood is used in a subordinate proposition when both contingency and futurity are expressed, or when the contrary fact is implied.*

The children look at it somewhat as a puppy looks at the house cat with its back arched and tail inflated: they look at it reproachfully, and turn away sadly.

"Now go on reading, please.

"There, stop there. Caroline, what would you say was the particular feature of this story as far as we have gone?"

Caroline says, "Well, I should call it—sad—or—I don't know—I don't care much about it."

"Oh, that's not what I mean," says the teacher; "I mean its literary feature. Don't you think it is the way the adjectives are used? Hugo had a great reputation in his day for adjectives. He seemed to know more of them than anybody else, and this is an excellent example of his style.

"And don't you notice, too, how short his sentences are? Now, why did he use such short sentences? Why, every author has his style, and Hugo chooses this as his because he liked it. I was always sorry he did, for it makes his writings so jerky."

"Do you know anything else that Hugo wrote besides this piece we are reading?"

Nobody knew, and there was every chance that nobody ever would know. They would always read pieces—rarely books, for they were trained to read pieces.

Here is a scene to set against that. It is not a class in reading, or in anything to do with letters. It is just the sixth grade beginning its session with its teacher on the morning of any day. The children selected each day one of their number to recite

some favorite poem; or, just as often, they sang together some song they loved to sing. A boy with shaggy hair and the clothing of a poor man's son, but with a happy face devoid of self-consciousness, being called on by his classmates stood up at his chair, and recited in a pure, cadenced voice this thing, which I afterwards learned was a prayer of the Navajo Indians to the Mountain Spirit:

Lord of the Mountain
Reared within the Mountain,
Young man, Chieftain,
Hear a young man's prayer.
Hear a prayer for cleanness.

Keeper of the strong rain,
Drumming on the mountain;
Lord of the small rain,
That restores the earth in newness;
Keeper of the clean rain,
Hear a prayer for wholeness.

Young man, Chieftain,
Hear a prayer for fleetness.
Keeper of the deer's way,
Reared among the eagles,
Clear my feet of slothness.
Keeper of the paths of men,
Hear a prayer for straightness.
Hear a prayer for courage.
Lord of the thin peaks,
Reared among the thunders;
Keeper of the head-lands,
Holding up the harvest,
Keeper of the strong rocks,
Hear a prayer for staunchness.
Young man, Chieftain,
Spirit of the Mountain!

How would you have felt if you had been there? In the midst of our general "mud and scum of things," in school and out, it was one of those poignant unexpected songs that Emerson asks us to listen for—a penetrating and unforgettable song.

And in the English classes of this school, what do they do?

Why they do what anybody would do who loved English literature and proposed to spread that feeling to children.

They tell stories, and they read books *through*. They read books through twice—just because children always do that. The story moves on from day to day and from wonder to wonder. Will you substitute for that the indifferent hash of the grade reader, all chopped together and compressed between two covers, and then think you will start any feeling for literature, even if the teacher is good? Will you take a chapter out of *The Wind in the Willows*, or the *Lance of Kanana*, or *Wolf the Storm-Leader*, the *Travels of Ulysses*, the *Nibelungenlied*, *Robinson Crusoe*, and miss the opportunity to give your children the whole experience? Why?

Can you give a satisfactory reason why real books are not used in schools instead of readers?

The curriculum-centered and the child-centered school. Schools in which the work is dominated by subject matter are sometimes referred to as curriculum-centered, while those in which conduct is the basis are sometimes referred to as child-centered schools. There is some danger that these terms may be misunderstood, and consequently lead to extremes and antipathies among teachers which need not exist. To avoid this it should be realized that the child-centered and curriculum-centered schools are not to be regarded as two antithetical or opposed types of schools. Such an erroneous conception of the matter regards the two types of schools somewhat as indicated in the accompanying diagram, which represents them as if they were lying at the extremes of a line:

Curriculum-Centered X ————— X Child-Centered

It cannot be too clearly pointed out that the differences between the two types of schools are not positive

and mutually exclusive, but merely relative. The two types of organization of work shade imperceptibly into one another. Rather than asking: "At which extreme of the line does this particular lesson fall?" we might ask: "On which half of the line does this lesson fall?", "At what point along the line would you place it?" The answers would depend upon the degree to which the lesson referred to partook of the various characteristics of teaching of one type or of another. Thinking of the matter in this relative sense some such diagram as the following might be helpful:

Curriculum-Centered Half of the Line

1. Subject matter the beginning point in the teaching process.
2. Teacher very active during and in the pupil's learning process.
3. Pupils passive in their own learning process.
4. The teacher guides the lesson in a predetermined course.
5. Group organization based on teacher-class idea. Not truly social. Each individual holds to his own position.
6. Order based on teacher control.

Child-Centered Half of the Line

1. Responses of students the beginning point in teaching.
2. Teacher as passive as advisable during and in the pupil's own learning process.
3. Pupils active in and during their own learning process.
4. Pupils active in determining the course their energies shall take.
5. Social grouping and free intercourse between members of the group.
6. Order based on group and individual responsibility.

With such a diagram in mind we might witness the teaching of a lesson and then indicate where along the

line we thought the lesson might be placed. A lesson which seemed to partake almost equally of both types of organization might be placed thus:

Curriculum-Centered Half of the Line		Child-Centered Half of the Line
<hr/>		

Again, a lesson might be placed thus:

Curriculum-Centered Half of the Line		Curriculum-Centered Half of the Line
<hr/>		

Such a lesson would be one which was dominated by subject matter, yet in which units of conduct were worked in, as for example, when the drawing teacher says: "You must all make Valentines to-day. Take your crayons, put a red heart in the middle of your papers and write, underneath it, *To My Valentine*."

A similar lesson might be placed thus:

Child-Centered Half of the Line		Child-Centered Half of the Line
<hr/>		

Such a lesson might be one in which the children's responses were regarded in initiating and partially in the carrying on of the work as when one of the children says: "Let us make Valentines." To which the teacher replies: "That is good, let us all make Valentines. Make your own designs and write in your own words but be sure to put a large heart in the middle because I want you to get some practice in washing on colors smoothly with your brush."

It is clear, therefore, that we cannot too carefully avoid taking the attitude that there are two opposed types of teaching, one of which is organized in terms of subject matter, the other in terms of children's responses; one of which is good and the other of which is bad. Rather should we think of the characteristics of each type of work, and determine in each specific teaching problem just what is best suited to prevailing circumstances of administration, supervision, structure of the subject matter, aims of the lesson, maturity of the students, and numerous other factors which combine in a thousand and one ways to govern the teaching process. It seems likely that good teaching would seldom fall at either end of the line. Probably the best teaching generally falls somewhere on the child-centered half of the line.

PROBLEMS FOR CLASS DISCUSSION

1. Charles, aged 9, has lost all interest in the subject matter of his school course. He makes frequent visits to the aviation grounds at Curtis field near his home. What could a teacher do to change this situation satisfactorily?
2. How might children be taught the geography of their own locality by subject-matter type of teaching organization?
3. How might the same lessons be taught by organizing the materials in terms of conduct?
4. Give concrete examples of the way in which teaching might be affected by: *a.* Prevailing circumstances of administration. *b.* Of supervision. *c.* Structure of the subject matter. *d.* Aims of the lesson. *e.* Maturity of the students. *f.* Other significant factors.
5. Does taking part in the actual rehearsal of a play give material assistance in memorizing the lines? Discuss in the light of the material of this chapter.

OUT-OF-CLASS ACTIVITIES

1. Write out a description of a lesson you have been taught, or seen taught according to a subject-matter type of organization.

2. Think out, if possible, a way in which the same elements of the curriculum could have been covered by organization in terms of conduct.

3. Tell a child how to make a boat, or a hat, or some such object of paper. Describe the process verbally, or write out a logical description of the steps, and allow the child to follow them. Teach a second child how to make the same object, permitting him to make the folds in one sheet of paper as you make them in the other. Compare the learning of the two children.

4. Visit several schoolrooms and place the lessons you see taught somewhere on the curriculum-centered or child-centered diagram.

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CHAPTER VI

THE CONDUCT UNIT

The conduct unit of life. Human conduct is not a continuous uninterrupted stream; it is divided into parts or separate acts. Consider, for instance, what we might call *the day's work* as including everything which an individual does from the time he awakens in the morning until he retires at night. It is composed of some such series as arising, getting breakfast, going to work, answering letters, making purchases and sales, getting lunch, going for a stroll, getting dinner, reading a book, retiring. This series of activities can not be grouped together on any intrinsic principle. To think of them together we fall back on some accidental characteristic, such as the fact that these things have all occurred during one day. We call it *the day's work*. They do not compose, as has been already stated, a continuous stream in any sense except that they happen to be consecutive in time. It is very different, however, with the unit acts which were referred to as composing the activities of the whole day. Getting breakfast, for instance, is very easily and naturally thought of as a distinct unit act, so also is going to work and many other similar activities in which an individual engages. It is such separable and distinct acts which are here referred to as conduct units.

It is to be noticed, however, that what is thus thought of as a separate act need not be begun and completed

without the intervention of other practically unrelated acts. For instance, a man may decide to build a new chicken house. He works at it in off hours through several days or weeks. In the meanwhile he carries on many other of the affairs of life. Goes to work every day, attends to his home tasks after dark and so on. There, is, nevertheless, a certain degree of unity about the act of building a chicken house.

Thus a conduct unit may be a matter of great importance and long duration, such as the building of a new tunnel under the Hudson River, or a brief concern of a few minutes, such as washing the hands. It may take such various forms as building a house, writing a poem, hanging out the clothes, playing Mendelssohn's *Spring Song* on the piano or thinking out the answer to a riddle. Superficially a conduct unit might be called anything which we think of as a separate act, the doing of which we consider to be a complete entity.

Even from such an incomplete description of what is meant by the term conduct it will readily be realized that it may be conceived of in a large inclusive scene or sometimes in a partial or contributory sense. For example, in the course of such a unit act as making a garden, one carries on such subsidiary or contributory acts as making the squash bed, the cucumber bed, and setting out the bean poles. There is no immediate practical purpose in distinguishing between these large units of conduct and the smaller ones. The mind analyzes a large conduct unit into parts and carries out each part separately. The important thing to realize is that this process of analysis does not go on indefinitely. One does not analyze the squash bed into eight sections and do each separately. Even if forced to leave the bed unfinished through the onset of darkness the ordinary in-

dividual would say that the bed was half-made or half done. The mind conceives of the various pulses, or sections, or parts, or fragments, or pieces, or bits of conduct as being cut off from others and capable of being separately conceived.

Wherein is to be found the unifying principle by which the mind separates one act or unit of conduct from another? Kilpatrick suggests that such a unifying principle is to be found in the purpose. When an individual purposes to carry out a certain act that purpose seems to dominate or hold together the whole act. For instance, take the case of the individual who builds a new chicken house. The action might be thought of as being initiated when the building process was purposed. It is the continuing influence of the purpose which governs the preparations and the actual construction until it is completed.

According to such a conception of the relation of the purpose to the complete act a definition of the conduct unit might be framed. A conduct unit would be any series of activities begun and carried on under the dominance of a separate purpose. Such a definition gives a helpful and on the whole, adequate, description. Thus one purposes to make fudge and carries the process through to conclusion under the shadow of the original purpose. One purposes to work a problem in arithmetic, to take a trip to Chicago, to "sing a song of sixpence" and the separate purposing indicates the span of the proposed piece of conduct.

There is a question, however, as to whether one gets nearest to the beginning point, or origin of an act in the *need* or in the *purpose*. Everything which one purposes, one purposes in response to a desire or need. By such a need is meant that state in the organism which

corresponds to a condition in the neurones. The neurone chains concerned in eating are in a state of readiness and the individual is hungry. We say that he desires or needs food. It is in such a sense that the word need is used. When the need to eat is experienced, the individual then purposes to eat. So in a sense the need may be said to precede and be the origin of the purpose. Therefore we might say that the complete act has its beginning or origin in a need of the organism. A conduct unit is any series of activities which is initiated and carried through in response to a need of the organism.

It may already have been noted that the term *conduct unit* is used as practically synonymous with the term *complete act*. This is true inasmuch as a complete act is certainly a conduct unit. But the term complete act is a definite concept which lays emphasis upon completeness. The term conduct unit is intended to emphasize the value of an act as a suitable element of school life.

It will not, however, be surprising to find the conduct unit described in terms of the complete act. A mere definition of the term could not be so helpful in explaining the nature of such an abstraction as a more lengthy description. Consequently such a fuller and more analytical attempt will now be made.

The conduct unit described. The activities which go to compose what have been referred to as conduct units may be differentiated as being of five different kinds. These activities may be referred to as needing, purposing, planning, carrying out, and evaluating.¹ It is not intended to maintain that every unit of conduct

¹The writer wishes to acknowledge at this point his indebtedness to his teacher, William Heard Kilpatrick, for the analysis of the complete act in terms of purposing, planning, executing, and judging.

contains all of these five steps, nor that in a given conduct unit these aspects are necessarily consecutive or undistributed. They are rather modes of the various actions which go to make up units of conduct. A consideration of some concrete activity in the light of these various aspects may help to make their nature and bearing somewhat clearer.

It will be more convenient, for purposes of illustration, to select for description a unit of conduct which involves considerable outward physical activity. In the meanwhile it should be remembered that there is another very important type of act, the act of thought, which may be accompanied by practically no outward physical action. Consideration will be given to such mental acts at a later point. For the present attention will be directed to a supposed case wherein a man or a boy decides to make a table and carries the operation through to a finish. His activities may be considered under the five heads previously suggested.

1. *Feeling or recognizing the need.* There must be some condition in the man's total environment which awakens in him the desire to make a table. It may be a purely mental state which induces him to say to himself: "I need something to occupy my spare moments—I must make something or other. I suppose a table would be the best thing." It might, on the other hand, be a clearly felt need of a table to keep his books on, or to serve in the kitchen. It would certainly be initiated from something which, consciously or unconsciously, appeals to the organism as meeting some need. In the case of an unconscious appeal one might say that the individual experienced a *felt* need, whereas in the case of a conscious appeal the need would be a *recognized* one. As long as the need remains unfulfilled there will be

a tendency for the individual to do something about it.

2. *Purposing.* The man under discussion, having experienced the need for a table, and seeing no reason why such a need should not be satisfied, now determines to make the table. He says to himself: "I will make a table." He has now a recognized purpose. As long as the purpose remains in force he will tend to do what he is able to carry it out.

3. *Planning.* Having once purposed to carry out the work he will now make various plans. Perhaps these plans will be merely mental. Perhaps they will be visibly drawn out on paper. They may be adhered to strictly, or they may be altered as the progress of the work indicates possibilities of improvement.

4. *Carrying out.* To carry out the plan he will now go about the various movements demanded for making the table according to the plan—sawing, planing, polishing—according to the original need.

5. *Evaluating.* This fifth aspect of the activity is to be distinguished as somewhat different from the other four in that it is in a special sense distributed over the whole progress of the unit of conduct and is of particular importance in determining the progress of the activities from beginning to end. If it is first considered with reference to the need, it will be obvious that, if the life of the individual is to be composed of valuable activities, it will be necessary for the ever wary judgment to be on guard to evaluate desires and needs at the very initiation of units of conduct. Thus the individual who makes the table should in the very beginning consider whether or no the need for the table is a good one. In such an instance as this there is of course no doubt about the matter. In other cases, such as the felt need for buying a box of chocolates, the need is not so

obviously a valuable one. Even when a need is judged to be good, further consideration may be necessary before the individual *purposes* to go on toward its fulfilment. Granted that the need for the table is good, yet perhaps the time is wanting, or perhaps expensive tools would be needed. Again, certainly during the *planning* judgment is continually in operation, as it is also during the *carrying out* of the construction of the table. Finally, when the table has been completed it must be put to the *test*. Perhaps the finished object is so obviously good that the testing may be merely a mental judgment: "It is certainly a fine table." On the other hand it may have to be put to use and found, too large, too small, or just the right size.

Limitations of the logical description of the conduct unit. It is to be noticed that these separated ways of acting are not necessarily cut off deliberately and clearly from one another in time. The plans might be altered after the table had been half executed. Even the purpose might be modified when the judgment had been issued. But although this is so the nature of the element activities is distinguishable.

It is to be further noted that in any given unit of conduct certain of these five modes or ways of action may be missing in the ordinary sense of the word. We do many things which we say are "needless." We certainly act on many needs which are unrecognized as such. In the more fundamental sense, however, it seems as though everything which we do is initiated in some condition of readiness in the neurones.

The phrase "purposeless activity" is frequently heard. It is certainly true that individuals do things without any conscious purpose, and a purpose can hardly be thought of in any but a figurative sense, as unconscious.

however, becomes absorbing. So, when the need is strong, the executing tends to be intensely carried out.

Mental acts. There are certain kinds of acts in which the factor of judgment comes into especial prominence. These are what might be called purely mental acts, such as the reasoning out of a problem, or of the answer to a riddle. Dewey makes an analysis of the complete act of thought, itself a conduct unit, in the following terms:

1. A felt difficulty
2. Its location and definition
3. Suggestion of possible solution
4. Development by reasoning of the bearing of the suggestion
5. Further observation and experiment, leading to its acceptance or rejection

The importance of the factor of judging in the mental act may be realized by considering the solution of a riddle in the light of the five steps.

The old riddle of the farmer crossing the river may be chosen. It is expressed somewhat as follows:

A farmer with a fox, a goose, and a bag of corn encounters a river. He has no means of crossing but a boat which is only large enough to hold himself and one of his charges. If the fox is left in the company of the goose, the goose will be eaten. The goose will seize any opportunity to eat the corn. How did the farmer cross the river?

Felt difficulty. On reading the riddle one immediately recognizes that there is some difficulty to be solved. This is a vague and ill defined feeling, derived, perhaps, simply from the question form of the riddle. More likely it is reinforced by the consciousness of the farmer's dilemma.

involved in problem solving, the aspect of judging becomes especially significant.

In summarizing the foregoing descriptions it may be said that a conduct unit is a series of activities arising out of a need and involving any or all the five modes of action, needing, purposing, planning, carrying out, and evaluating.

Conduct units classified on the basis of needs. It will be of distinct advantage in the organization of school life in terms of conduct to be able to recognize conduct units of different types. Considerable confusion and difference in classroom practice has arisen through failure to distinguish conduct units of different kinds. Teachers have frequently, in their attempts to organize school life in terms of conduct, neglected to differentiate between various types of activities, and have attempted to cast all the work of their schools into units of one type or another to the exclusion of other types equally essential or valuable. It seems to be useful to make such a classification of types of conduct units on the basis of needs, or of the origin of needs.

1. **Units of construction or creation.** Certain units of conduct have their origin in the felt or recognized need to accomplish some tangible result subsequent to the action. Individuals feel the need to secure some objective product, such as a bird fountain for the garden, or to express themselves by the unfolding of their personalities in such a way that there will be some objective creative result, such as an original composition for the piano or a lyric expressive of certain amatory or æsthetic emotions. Units of this type demand great freedom of action on the part of the individual. In their progress they refer forward to an end-product, and all the resources of the individual are directed

toward the embodying of the finest self-expression of the individual in a finished result.

Such units of conduct are highly individualistic. They require for their progress the shuffling off of such trammels as the individual can wisely dispense with, such as outworn tradition, conventions no longer useful, and as much of the hampering limits of time and society as can be safely done without. In their progress the individual considers largely his own interests, his own ideas, and interprets the world in terms of his own personality.

Certain schools have laid special emphasis upon conduct units of this type. The teachers in them feel that it is only by freeing the personality of the child that he can develop to the maximum advantage and build up a personality of richness and diversity, capable of conceiving the world in new ways and leading on to expressive genius. There is undoubted truth in the fact that the personality needs training in modes of creative expression. On the other hand, overemphasis upon units of conduct of this type makes for an undue weighting of the individual-social balance on the side of the individual. It is extremely valuable for a changing age such as that in which we live, but alone it is positively dangerous in a society such as that of America at the present time with what Bagley characterizes as "our zeal in making laws and our zest in breaking them,"² and with "something akin to a tradition of lawlessness."³

It should be clearly realized that the developed judg-

²W. C. Bagley, "The Profession of Teaching in the United States," *School and Society*, Vol. 29, Jan. 1929, p. 101.

³W. C. Bagley, "Some Handicaps of Character Education in the United States," *Educational Administration and Supervision*, April 1929, p. 211.

ment and experience and controls necessary for the lawful and wise expression of the personality in construction and creation presuppose elements in the training of children which are not solely of this type. In other words, desirable and important as such conduct units are, there are other types which are necessary for the rounded and complete development of a social individual. Furthermore, such is the condition of society in the United States to-day, that freedom and self-expression are the order of the day, and the training given by agencies other than schools tends to be in the direction of self-expression and the freeing of the personality.

2. Units of play or recreation. A second type of conduct unit is that in which the need does not refer forward to the accomplishment of any result, or backward to the fulfilment of any principle, but merely to the free expression of trends of the personality with reference to present harmless enjoyment. Such units are those in which a little boy plays ball or goes for a swim or in which he reads a short story in the magazine *Boys Life*. They demand for their enjoyment the setting apart of a period of time which is not limited by other demands upon the personality, and which will have at its finish nothing objective in the way of results. A unit of this type is spontaneous, free, and restful because of the freedom from the strain of predetermined or postdetermined conditions. What learnings take place in it, in addition to the learning *how to play*, are largely indirect, and contributory to the health and growth of the organism.

The importance for the individual of such units of conduct lies in the fact that individuals need to learn to habitually devote time to that kind of play which

will be desirable from the point of view of the individual and of society.

3. **Units of work or duty.** In the third type of conduct unit the need refers backward toward some acknowledged principle, some recognized law or some existing state of affairs prior to the action. This type may be represented by a boy's staying home from a ball game on a damp day in accordance with his mother's orders; weeding the garden in the heat in order that his father may not have to do it; or leaving the social family group and working on a set of arithmetic problems until they are solved. Many examples of such units of conduct may be found in the realms of obedience to the moral law or to the law of the land, of response to a state of affairs which must be changed by energetic action, or of problem solving of one sort or another.

Such units place a considerable degree of limitation on the action of the individual. This limitation may be due to the restriction inherent in group life, which demands that individuals give and take, be restrained as well as full of initiative. So a man gives his seat to a lady in the subway, or refrains from whispering at a symphony concert. Again, the limitation may be due to the presence of some state of affairs which is a pressing practical necessity, such as that which caused Samuel Johnson to write *Rasselas* in a week to pay the expenses of his mother's funeral. But there is still another state of affairs which is of special significance, namely that of enthusiasm for the actual work projected. Conduct so resulting is conduct of the highest and most worthy order, as for example, when an individual full of enthusiasm for reading and thinking reads a copy of Aristotle's *Ethics*.

It was the writer's good fortune recently to enter

the schoolroom of Mrs. D. Dawson Wallace, in the Dawson School, New York, and, after observing the enthusiasm with which the children went about their work to have the opportunity of questioning them. The children were so happily and earnestly engaged that the writer asked one of them:

"Tell me, Rose, what is it that you like about your school?"

"I like my arithmetic," was the radiant reply.

"And, Pierre, what is it that *you* like about school?"

"I like my spelling," was the answer of this small French boy, whose stock of English was far from large.

"And you, Ben, tell me what it is that you like."

"Oh," replied Ben, "I like my work, I like everything."

We have to-day a great deal to learn from a school teacher whose pupils sincerely and happily do their work and like it best of all.

Mixed units of conduct. It should not be thought that every unit of conduct may easily be placed in one of the three classes enumerated, creative, play, or work. In fact, it is with difficulty that one finds units of conduct so typical of their class that they will serve as good illustrations. As in most of the natural realm one class shades off into another, like the soft blending of the colors that we see in the rainbow. Yet because the rainbow colors are not in gaudy flat stripes we do not fail to distinguish our red, yellow, green, blue, indigo, and violet. We do not classify colors with the intention of falsifying the nature of the rainbow, but for convenience in the practical affairs of life. So we do not classify units of conduct with the intention of falsifying or denying the infinite complexity of human action,

but for convenience in dealing with the conduct of children in the practical problems of the schoolroom. So it may be that the writing of a book may partake partly of the nature of creation and partly of the nature of work, playing golf may not be pure play but under certain circumstances may be partially duty, while the veriest slavery and drudgery of the stokehole may carry a great liner across the Atlantic, and accomplish a visible constructive result. Systems of classification are seldom perfect. The biologist is not always able to distinguish a plant from an animal. How much more then, in the realm of human conduct, may we expect to find overlapping and blending of types. Here as elsewhere, we classify for convenience and practical necessity.

Deeds, and acts of thought. It may prove useful at this point to refer to a difference which was touched on earlier in this chapter, namely, the difference between acts which are largely physical, outward, and concerned with visible bodily conduct, and those which are largely mental, and concerned with inner mental processes. It is to be observed that this classification cuts directly across each of the three types of conduct units already distinguished, so that if we wish we might distinguish six types rather than only three. We might then consider as examples such various activities of individuals as (1) Building a house, (2) Playing a game of tennis, (3) Carrying in a load of firewood, which are obviously *physical*. On the other hand, we might consider other things which men do such as, (4) Writing a play, (5) Telling a joke, (6) Working out a set of accounts, which are on the whole *mental*. All of these varied activities should find their prototypes in units of conduct carried on by children in school.

PROBLEMS FOR CLASS DISCUSSION

1. Discuss the following quotation from Pestalozzi's *Leonard and Gertrude* in terms of the present chapter.

In the evening he helped his oldest son to build a Tower of Babel such as was pictured in his grandmother's Bible, out of a heap of clay; and taught him to calculate the amount of lime and stone and sand necessary to construct a given length of wall.

2. Discuss in terms of the present chapter the following comment made by Quick on Pestalozzi.

And taking as his starting point the needs, desires, and connections of actual life he was naturally led to associate the work of the body with that of the mind, to develop industry and study side by side, to combine the workshop and the school.

3. What do you consider to be the meaning and application of the following statement made by Dean Woodbridge in the Sachs Lectures at Teachers College, Columbia.

It is always the past that is the teacher, whether you like it or not.

Consider this statement in relation to the three types of conduct units described in this chapter.

4. Choose an original example of a conduct unit of each of the three types and trace critically the five modes of action as involved in each case.

5. Try to think of a unit of conduct which may not be classified as of one of the three types of conduct units or as a mixed unit.

OUT-OF-CLASS ACTIVITIES

1. Take some exercise in geometry and solve it. Then trace the steps of your thinking in terms of Dewey's analysis of the complete act of thought.

2. Examine introspectively and classify the units of conduct in which you have been engaged to-day.

3. Visit a schoolroom and classify the units of conduct in which the children are engaged.

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CHAPTER VII

THE CONDUCT UNIT IN THE SCHOOL

The essential idea presented in the immediately preceding chapter is that of the organization of life in units of conduct as a basis for the organization of school life. It is necessary to lay emphasis upon this point because of the fact that there is a tendency among some teachers to be confused in this matter, and to think that the best teaching is restricted to the use of one or two of the types of conduct unit mentioned in the last chapter. Teachers who restrict the activities of their pupils to certain types of units and exclude others have but a partial view of the educative process. If it be true that "All work and no play, makes Jack a dull boy," nevertheless, all play and no work does not necessarily produce the opposite result. It is clear that what is essential to progressive teaching is not the restricting of classroom teaching to constructive or creative units but the organization of school life in terms of desirable and suitable conduct.

There is much to be gained by building the school day of units of real living. An attempt to do so, however, works a revolution in more customary ways of school teaching. It makes the teaching process an extremely complex matter. It demands that the teacher abandon a cut and dried conception of classroom procedure and regard the work of the school as an unfolding and development of conduct. It makes teaching largely

a matter of initiating and guiding fruitful pupil activity. To some extent it substitutes for relative certainty of procedure a degree of uncertainty, for rigidity an amount of flexibility. The teaching process loses something of the monotonous safety of conservatism and partakes of the energetic spirit of adventure.

Children come to the teacher in the spirit of adventure. They are definitely ready and eager to *do* something. What shall the teacher allow them, or give them to do? The teacher turns to the curriculum to find out, but the ordinary curriculum does not give much assistance, perhaps rightly so. It has nothing to say about *doing*. It expresses nothing in terms of conduct. It is objective. It is not related to life. It is unrelated to the personality of the learners. It is abstract. In other words, it is related neither to teaching nor to learning.

Consider the way in which the educator of the past went about the preparation of the curriculum. He considered the needs of the adult world and abstracted from them certain things which he believed a child should learn. He collected a certain amount of knowledge of this and that and the other and arranged it in logical order, according to the clear vision of the adult mind. He arranged the facts of history in chronological sequence. He selected and isolated the processes of arithmetic which the world uses to solve its problems of simple measurement and reduced them to clear, logical, and succinct form. Thus he drew, as it were, the essentials of living and concentrated them into their abstract essences. These he arranged in what seemed a convenient sequence, and called it the curriculum. The curriculum was arranged in a logical order, based on the intrinsic character of the subject matter.

Having thus concentrated the essentials of living into

a curriculum it was passed on to the teacher. The teacher was faced with the problem of fitting the subject matter to acts of conduct which would involve its use. Sometimes such acts would be merely *learning the lesson, doing your work*. At other times artificial conduct units were staged or arranged under the dominance of the subject matter but still having a semblance of the imitation of life itself. Such an example as the following quoted from a textbook of method still in use, will illustrate this manufacturing or invention of conduct to fit the subject matter. It represents a step in the direction of vitalized teaching, but a feeble one.

TYPE LESSON

Lay and Lie

The teacher will ask each pupil:

1. To take a pencil.
2. To place it on the desk.
3. To say at the same time, "I lay the pencil on the desk."
4. Then to say, "The pencil lies on the desk."

As each statement is made by the pupil, the teacher writes it on the board.

In the same manner the teacher will ask each pupil:

1. To take a book.
2. To put it on the floor.
3. To say at the time, "I lay the crayon on the book."
4. Then to say, "The book lies on the floor."

The teacher next asks the pupil:

1. To take a crayon.
2. To lay the crayon on the book.
3. To say at the time, "I lay the crayon on the book."
4. Then to say, "The crayon lies on the book."

There are now two sets of sentences on the board. In the first pair:

What word in the first sentence denotes what was done?
Can we put *lie* in the place of *lay*? No.
What does *lay* mean? To place.

Such an answer as the following may be given: *Lay* (or *lays*) means place (or places, put or puts). What does *lie* mean? *Lie* (or *lies*) means are (or is) in a fixed position.

Similarly use the words, *lay* or *lays*, with pen, slate, cap, mitts, as:

He lays his slate on the table.
Now use the word *lies* with each, as:
His slate lies on the table.

Some sentences with blanks may be given to test the pupil's knowledge, as:

The paper on the desk.
The boy's cap on the floor.
Charlie the slate down quietly.
The dog in the doorway.
The cat on the new rug.

The following pairs of words may be similarly dealt with:
Set and *sit*; *raise* and *rise*; *set* and *sat*; *raised* and *rose*;
laid and *lay*; *laying* and *lying*.

This plan for a lesson on *lay* and *lie* is a model of good teaching under the old system. It is really an excellent attempt to bring nearer to actual living the organized abstract rules of grammar which are found in the textbook.¹

But instead of building school procedure from bricks of subject matter and attempting to infuse that subject

¹ A more complete organization of a lesson on *lay* and *lie* in terms of conduct is presented later in this chapter.

matter with life, would it not be better to begin with units of life itself, life which demands the use of the subject matter which the child should learn. Is it not possible to substitute conduct units of school life for subject-matter units? Could not the conduct units composing school life involve the subject matter instead of attempting to revivify the abstract subject matter with half-hearted conduct?

THE SELECTION OF UNITS OF CONDUCT SUITABLE FOR SCHOOL LIFE.

1. The conduct units selected should be like life. Thus arises the question as to whether or no the life of the school may be organized in units of conduct which actually involve the use and mastery of subject matter of the curriculum. The success of many teachers in new-type schools is sufficient proof that they may if the conduct units which make up school activities are of the right kind. No such folly is here suggested as that anything which may be called a conduct unit is fit for school life. This would mean that the school would train the amateur burglar as well as the incipient novelist. On the contrary, only chosen conduct units can be considered suitable material of which to build the life of the school. In the course of their activities, of their doing, children may initiate different types of conduct units. Furthermore, the conduct units when once initiated, may be carried on in different ways, and with relative degrees of thoroughness. Consequently, it is necessary that the life of the school be organized into conduct units which are initiated and carried on in accordance with the nature of the conduct unit as outlined in the previous chapter, each step being well gov-

erned by the overruling factor of judging and evaluating.² Again, the unit acts should be such that the subject matter of the curriculum would be involved in their execution.

But even though it be agreed that a child should be trained to act in school in ways in which he should act when he leaves school, so simple a principle does not solve the problems of education. Its application is no simple matter. There are many difficulties to be encountered in its administration. Followed to its logical limits it might be taken to indicate that the best preparation for a grocery clerk would be to be brought up in an ideal grocery store on a play level. The banker would be trained in a toy counting-house and a lawyer in an atmosphere of childish litigation. The obvious benefit of such an arrangement is indicated by such cases as those of the great musicians, who mastered their instrument in childhood. Most great organists have been boy organists. But however beneficial it may be it is, of course, utterly impossible for everyday school life. It is but one child in a thousand who is so exceptionally endowed that the nature of his talents is clearly evident from childhood. The career which an individual will follow is often only to be determined by circumstances and abilities which cannot become evident until comparatively late in life.

The limited function of the elementary school. It is not necessary, however, to reproduce slavishly the conditions under which individuals are to live. There is

² There is no intention of here suggesting that lessons should be formally organized according to the formal statements concerning units of conduct. Any rigid organization of all teaching into a set of formal steps, such as the Herbartian Five Steps may be the ruination of teaching.

so much in modern life that all individuals hold in common that those things alone are more than sufficient to fill up the first six years of school life. The things which children in the elementary school should learn are the most essential things, the things which are of primary importance to all people, the things which are the basic needs of all individuals in our present-day society. The curriculum should include those experiences which every person ought to have. The child should come into the riches of his social inheritance, understand social usages and human relationships, become a master of such basic skills as are needed in everyday life, learn to fulfil his moral responsibilities. In the administering of a curriculum based on such things the school will find adequate materials of a nature that will contribute to the needs of all until such a time as the individual needs and aspirations of particular pupils begin to develop clearly.

Such a field of activity affords abundant opportunity for the establishment of relations with the world we live in. There are many ways in which the schoolroom may be like the great outside world with which it must maintain and make its contacts. It is neither necessary nor desirable that the schoolroom should be a replica of a modern community. Education then would become mere recapitulation and society would be static. There are ways in which it should be different.

It might be profitable to compare and contrast life in the grown-up world with life in the child's world in school.

1. The child and the adult world are the same in that they are both ways of *living*. An hour of the child's time is just as important from the point of view of the whole life as an hour of the adult's time. The child's hour is not a period of time

in which he is storing up something to be spent in later life, is not a reservoir which is to overflow in youth and manhood, but life is a stream, flowing continuously from birth through an ever widening channel. Living does not stop when learning goes on, but true learning is living which intensifies and enriches life.

2. Although the child lives in the same modes or ways as the adult he does not do the same things. The little girl in caring for her doll does so in ways that are those of the mother but she does not do exactly the same things, merely things which are like them. What she does as a child is that which is suited to her stage of development, what she does as a mother is suited to the later stage of motherhood.

So it should be with the educative process. What the child does in school should not be the very thing it will do in later life but something which contains essential and similar elements. Playing with dolls is a truly educative occupation. The child may do many things which are like those of his elders but are better suited to his stage of growth. The boy plays baseball, the young man tennis, the middle-aged man, golf. Each of these is a ball game but each is suited to a particular time of life. So things which are done in school may be different and yet be carried on in ways which are similar to those of grown-ups.

3. If the ways of the world were ideal the ways of the school might be like them. If the ways of the school were ideal its training for life might not be practical. As neither of these situations is likely to come about the school may take a safe course by encouraging ways of action which are in obvious harmony with the moral code as generally accepted. Thus in the school grocery store there is no sharp practice, in the community things may be different. But the training of the school is in practical honesty which cannot be entirely without effect on the life of the next generation. Thus it is clear that the school may be different from the world in that its ways of doing things are not exactly those of the greater society, but nevertheless are in accordance with accepted ideals.

It is plain, therefore, that while living in the school and living in the world need not be exactly the same,

nevertheless, they should contain similar factors. But just what are these essential and similar factors? Is there some least common denominator between a good school life and a good community life?

Common factors of in-school and out-of-school life. There are several factors which may be common to both the schoolroom and the world. In the first place, the environment may in each be social. In the second place, the materials with which the children deal may be similar to those of adults. Thirdly, the children's ways of doing things may be similar to the ways of grown-ups. In these three respects, which will now be briefly discussed, the essentials of life outside the school may be reproduced in the schoolroom.

1. Social environment. What is meant by the social environment has been previously explained. It need only be pointed out here that community life is a form of associated living. If children are to learn to get on with one another in community life, they should be associated with one another as children in matters which involve mutual assistance, coöperation, and individual restraint. The group living of childhood is the forerunner of the group life of modern towns and cities.

2. Materials of the environment. Men and women spend their time dealing with ideas or objects. These are what is meant by the phrase, the materials of the environment. People read, write, converse, keep shop, operate railways. All these things children may deal with. They may read books, write stories, talk to one another, play at store, construct a toy railroad. The materials of the school environment may be similar to the materials with which the world is concerned.

3. Ways of doing things. To avoid repetition this matter need not be dwelt on. Children should do things

which are different from the things which adults do, but they should do them in similar ways. A man may write a book for publication by an established publishing house. A child may not do just that thing, but he may make a book himself to circulate among his fellows, or he may contribute to a small book to be printed in the school press. Obviously, what he does in such cases would be more like the conduct of people in the world in general than if in common with thirty other children he wrote an essay on—*Why I like to come to school*—for nobody else to read.

It follows that if the teacher is to select suitable units of conduct, in the experiencing of which the children shall cover the curriculum, those units of conduct should usually be social, should deal with an environment with elements which are similar to those of the outside world, and should be carried on in ways which resemble the ways of the world in general.

What then is the problem of the teacher who desires that school life shall be real living? It is the problem of directing the life current of the children into activities which will actually be modes of living for children of that age, but which will, at the same time, involve the mastery of subject matter of the curriculum and the technique of living itself. The teacher must so direct and guide the impulses and responses of the children that they will initiate and carry out units of conduct which involve the subject matter of the curriculum. The curriculum will thus become associated with ways of living, it will be revived, it will have restored to it the living quality of which it has been deprived. The activities of the children would recast the subject matter into life molds.

To make the matter more concrete let us return to

the case of *lay* and *lie*. How may the subject matter of this lesson be involved in a unit of conduct which will be part of the life of children and will yet lead on to a fuller and richer life for them as adults? The question is somewhat beside the point because of the fact that it is only in certain cases that children do not use *lay* and *lie* properly. Children brought up in homes where these words are correctly used and where their speech is guarded, will seldom fall into poor usage of these words. Grammar is subject matter, speech is conduct. If the speech of the individual is incorrect it needs to be improved. If an individual misuses *lay* and *lie* he should improve. If, however, he uses these words correctly then that element of the curriculum may, for that particular individual, be regarded as covered.

Let us consider a plan which would involve the correction of the language of an individual who misuses *lay* and *lie*. Supposing that in the course of telling a story or of answering a question some child in the group makes a slip in English, for example, suppose a child uses the sentence "Them answers is wrong." It is possible that another child might object at this point and say: "Tony said '*them* answers.'" If the class lets the mistake slip the teacher might say "Did you say the sentence correctly Tony?"; or she might bring out the fact that Tony had made a slip in English by one method or another. The matter might then be relegated to a later period or to a class conference.

When the matter comes up in conference later, it might be decided that Tony was not the only one who made mistakes which should be corrected, but that nearly every child had some mistakes of his own. A scheme might be worked out by which every individual might keep a speech card and whenever an error hap-

pened to be made in class it might be called to the attention of the maker who would enter it on his speech card. After a few weeks the whole class might devote time to their speech cards and to discussion of improvement. Individuals might consult the "grammar" on the faults they had made, prepare exercises for their own use, explain their own mistakes to the class, speak a number of sentences to them, each of which involved correct usage of the words concerned. The individual who misused *lay* and *lie* would thus have his opportunity to understand and correct his own personal error and would be taught to watch his own speech in and out of school and report to the class when he had completely overcome his fault in that direction. Thus might the child live his speech life well in school in a way which would contribute to the correct use of speech for the remainder of his life.

2. Fallacies to be avoided in the selection of suitable conduct units. 1. *The avoidance of units of construction or creation.* The traditional school has tended to avoid units of conduct which result in construction or creation. Such a state of affairs is easily understood in the light of the development of the old-type school as indicated in the first chapter of this book. Such units demand a freedom of organization, a richness in the environment, a completeness of equipment which was missing in many schools of a generation ago. Furthermore, such units demand for their administration a freshness and originality on the part of the teacher, a devotion, an inspirational attitude, which is only granted to the gifted and the well trained, and which demands freedom from restrictive administrative control.

2. *The inadequate understanding of the function of units of play.* Play as an agency of education is, unfor-

unately, widely misunderstood. To the lay mind it has often signified a waste of time and soft pedagogy. To the sentimentalists it has often held a place in the school in order to make the children happy or to keep them entertained and amused. To the formalists it has only too often been scorned as an enemy of staunchness, hardihood, and integrity. All such biased views are pitifully aside from the point. Play in school is a means of learning. When it ceases to be educative and is merely a form of bribery it has no standing in the classroom. When it is present to the undue exclusion of other types of conduct it is equally reprehensible. When it is absent the situation is tragic. A kitten learns to catch a mouse as it plays aimlessly with a ball of yarn. So a child, given a normal amount of play, grows and learns.

3. *The avoidance of units of work and duty.* There has been a recent insidious tendency to drop from the school-room activities so irksome as those involved in work and duty. In such neglect it is generally the teachers of the newer type, who frequently call themselves "progressive" who tend to be the sinners. It is easy to understand how some excellent and original teachers might, in the haste and excitement of recent changes in classroom work have fallen into this error. In the first place such a tendency would result as a reaction from the rigid, overdisciplined school of earlier days of public education. But there is still a more subtle reason. It is not difficult to cast play activities or constructional activities into molds which are like the life of the world, but the casting of work activities into such molds is often beset with difficulties. In the first place, the absence of money as a motivator, the absence among children of the necessity to support themselves by earn-

ing a living removes from the school one of the factors almost always associated with work in the outside world. Again, the free spirit of the age, its individualism and its desire for easy self-expression has produced an attitude in society which has tolerated laxness. So we hear of new schools gone wrong. The modern school is violently satirized in the pictorial journals. The teacher snoozes while the children saw off the piano legs. It seriously behooves educators and teachers to concern themselves with the study of the problem, to discover ways in which units of work and duty in the school may resemble units of work and duty in the world. There must especially in the higher grades be a search for new tasks that are difficult.

4. *The avoidance of conduct units which involve mastery of skills.* Not only have the new teachers failed to find new tasks which are difficult but they have tended, in some extreme cases, to avoid tasks which are old and reliable. It is possible to understress those common skills which everybody must develop.

But how arrange for the mastery of such tool subjects as writing and arithmetic? Here is a question well worthy of consideration. The adult who wishes to employ multiplication or addition in his personal affairs is not hindered as the child by a lack of the necessary skill. A child may be blocked in the middle of an act by lack of skill. A special situation arises whenever subject matter must be overlearned, when a skill or special facility in doing must be acquired, when the thing learned demands practice.

Whenever the act to be carried out involves the use of an unlearned or partially learned skill, a special type of conduct unit may be distinguished. It is one in which the purposing and planning may be successfully carried

on but in which the step of executing may be very long due to the fact that part of the action involved in executing must be perfected by practice. When a degree of perfection has been reached, the conduct unit may be completed. Such is the case when the boy sets out to find the length of his footsteps with a pedometer. He is blocked in his calculation by a lack of knowledge or skill in the process of division. He must now pause and acquire sufficient degree of mastery to go on. In other words, he must drill. Thus school drills, which, might at first seem, when considered alone to be entirely unrelated to anything in life are found to be intimately related to it. In fact, so important is this relation that no school drill can be truly and normally motivated unless its relation to a personal unit of conduct is felt.

Similar situations arise in the life of adults. Consider the case of the man who learns golf. He goes through hours of unsatisfactory practice because he realizes that his lack of skill is interfering with the accomplishing of his purpose. It is this consciousness of the importance of skill to his success in the game which urges him to irksome activity.

When school drills are so motivated they are most truly related to living. If the child can be made to feel that a series of important conduct units is being blocked through his lack of skill he will be more ready than anything else can make him to undergo an arduous course of practice. A drill, then, is not to be considered as an isolated and unrelated process, but is to be regarded as an extended part of one of the steps of certain important conduct units. As such, drills may be as lengthy, and as frequent as other considerations dictate.

In the case of conduct units in which the step of executing is delayed during the mastery of a skill, it

will be found that encouragement may be given to pupils if they are allowed an opportunity to realize their progress such as those provided in the new practice tests. *Mediate goals* may be set up along the way, so that children may not be required to wait until the skill has been perfected before they become conscious of definite gain. To this end children may keep records or graphic charts of their own progress in such skills as spelling or addition, or their improvement in handwriting may be noted by comparison with objective handwriting scales.

Pupil freedom and responsibility in the selection of suitable units of conduct. In the selection of suitable units of conduct the teacher is sooner or later faced with the problem of what degree of freedom is to be allowed the pupils in initiating and governing their own school activities. What freedom shall they be given in inception and in execution? To what extent may students be allowed to do what they like, to do it in the way they prefer and at the time they wish? We hear of "free schools" and wonder what they are.

In answering these problems we are once more faced with the relative quality of the teaching process. All degrees of so-called freedom may be allowed to children under certain corresponding circumstances. There is a balance which must exist between freedom and responsibility. "Free schools" might better be called "responsible schools."

Freedom is the reward of willingness and ability to accept responsibility. In Miltonic phrase: "Virtue; she alone is free." So in the initiating and carrying out of any unit of conduct the degree of freedom which may be allowed to children is directly related to their willingness and ability to accept responsibility for the unit

of conduct involved. School life should train children to accept this responsibility more fully and, as they grow older, in relation to more difficult and complex units of conduct so that in the end individuals will be independent of their teacher. It is the teacher's mission to make herself increasingly unnecessary to her pupils.

PROBLEMS FOR CLASS DISCUSSION

1. Discuss each of the following as a suitable element of classroom work.

- a. Reading, *Alice in Wonderland* silently and individually.
- b. Learning the "7 times" multiplication table.
- c. Working out a problem in algebra which depends for its solution on the binomial theorem.
- d. Working out a problem in statistics which involves knowledge of a short method of calculating averages.
- e. Learning the conjugation of the future perfect tense of *amo*.
- f. Joining with and helping other children to make a doll's house.
- g. Listening to the *Peer Gynt Suite* played on the victrola.
- h. Individual pupils reading in turn to a listening class successive paragraphs from a selection from *Pickwick Papers* printed in a textbook, a lesson which was prepared at home the preceding evening by all the pupils.
- i. A spelling match.

2. What effects would result from training children in a school where units of play were overstressed? Where units of work or duty were understressed? Where units of creation or construction were neglected? Where mastery of skills in reading, writing, and arithmetic were neglected? Where skill in writing down musical tones was neglected? Where skill in making simple drawings was neglected?

3. Comment on the following quotation from *The Cradle of the Deep* by Joan Lowell. She, according to the account given by the author, was brought up by her father at sea from the age of less than a year to the age of seventeen.

There was no seaman's work that they did not teach me. I learned arithmetic by adding up tide tables in navigation books. Before I was twelve I could take a "sight of the sun" and figure

out our position on a chart. I learned to read intelligent "things," as I termed them from an old battered set of the encyclopedia. We had a complete set except for the volumes "N" to "S." As a result I had read everything in those encyclopedias except the subjects contained in the missing volumes.

4. An algebra teacher regularly assigned a large number of questions to students to be worked at home. Each day he opened class by calling on the students by name for a report of the number of questions they had worked at home. If the report was not large enough the student was penalized by being compelled to return to the school for an afternoon session. Some bright students did most of the assigned work. A large number of the students reported a number of problems far in excess of what they did. Discuss this case in the light of the material of the present and preceding chapters.

5. A boy of fourteen while playing was overheard by a master calling another master "an ass." He was given the choice of a "spanking" or of six weeks' cessation of "leave." He chose the latter and was derided by master and boys. Discuss the learnings involved in the light of materials of this book.

6. Two boys caught fighting were stopped by the school principal, and warned. They determined, nevertheless, to have the matter out. Caught a second time they were given choice of avowing regret before the whole school and promising not to fight again, or of taking a strapping. They chose the latter. After two slaps of the strap the boys were commended for their pluck and for not surrendering their freedom to fight. Discuss the case in the light of materials of the present chapter.

7. Grant was a twelve-year-old boy of ability. One day, while carrying a copy of some plays of George Bernard Shaw which he had borrowed from a public library, he decided to enter for an hour or so a building which he was passing. Not wishing to carry the book he opened the top of a garbage can nearby and left the book in the can while he made his visit. Discuss the matter of the subsequent training of this boy in terms of the types of conduct units needed in his training.

8. There has been developed by Hugh R. Newsom of New York, a Junior Railway. This is an electric system with 3,600 feet of toy track, intricately arranged. It takes about a dozen

boys to operate it, each guarding a battery of levers and lights which govern the movements of the ten or more trains over bridges, under tunnels, and at switches. Mismanagement causes faulty operation, slow speed, bad management and wrecks. Each boy holds a job during the operation of the railway and is given demerits for faults. Failure to operate well means immediate loss of the "job." The most successful boys become directors with privileges, and the winner in the yearly contest for least demerits becomes President for the year. Discuss the units of conduct involved as to their nature and suitability as an element in the training of boys.

OUT-OF-CLASS ACTIVITIES

1. Visit schoolrooms and consider the work with relation to the matter of a balanced use of all types of conduct units.
2. Secure a copy of *The Play Way*, by H. Caldwell Cook, and look at the pictures. Consider them in the light of the material of this chapter.

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CHAPTER VIII

VALUES IN CONDUCT ORGANIZATION

What educational values are to be obtained by the organization of school life in terms of conduct? It is necessary that any scheme or method for carrying on the educative process should meet many demands and fulfill many requirements if it is to fit the needs of the modern school. An attempt will be made in this chapter to point out that the type of organization which is here suggested is particularly well adapted to the securing of some of the most important values which schools seek to obtain.

Conduct unit organization assures the subject matter values obtained in the past. The school training which has customarily been given for years has aimed to provide all the children of the elementary school with a common body of ideas, ideals, and skills.¹

The child in the first four grades is primarily engaged in acquiring the technique of reading, writing, and arithmetic, and to a less extent the technique of music and industrial arts, including drawing, painting, etc. In the fifth and sixth grades the pupils have, generally speaking, a sufficient command of spelling and writing to begin writing original compositions, a sufficient control of number combinations to apply them to practical problems found outside the textbook, a sufficient grasp of musical notation to do simple sight singing and to work out simple harmonies, and sufficient skill in

¹H. G. Lull and H. B. Wilson, *The Redirection of High-School Instruction* (Philadelphia, J. B. Lippincott Co., 1921), p. 17.

using pencil, crayon, scissors and shop tools to work out simple and original designs in drawing and simple projects in manual training.

So much the elementary school should attain. Any system of schools which did not secure these important results could be easily and rightly criticized. These things have been accomplished in the past and must still be accomplished. It may be realized from what follows that all these things are looked after by sound progressive schools.

One of the most important purposes of the school is to transmit the social inheritance. That social inheritance is the body of information attitudes and skills which race experience has found most valuable and so has preserved. This process of transmitting the fruits of experience from one generation to the next may be described as the process of acquainting children with the tools of culture and giving skill in the use of these tools.

May not these ends be attained just as well by life units of school work as by the more customary subject-matter units? Which is the better calculated to enable a child to gain mastery of the various skills involved in silent reading, the study of a school book containing isolated and selected excerpts, or the reading of a story picked according to human individual interests from an available store of good things for boys and girls to read? When will he gain the more knowledge of a medieval city, when he reads of it in his history to fulfill a ten-page assignment or when he seeks out the information from texts and libraries in order to enable him to construct his city visibly before him in the sand table?

A skilful arrangement of school work makes it possible for the life activities included in the curriculum

to contain or involve practically all the old familiar subject matter. The geography of the whole Great Lakes district may be involved in a study of the proposed international canal. The early history of the United States may be involved in a discussion of Indian life arising out of the reading of *Hiawatha*. In fact, every child and group of children has many active interests which if skilfully directed will lead to practically any part of the curriculum. It is thus not necessary to neglect any of the fields which have been successfully covered in the past. It is simply a matter of making the proper adjustments so that the subject matter to be covered shall be intimately connected with some activity in which the particular children concerned are interested.

Whether or not progressive schools give their pupils mastery over traditional subject matter is fortunately not a matter of mere abstract opinion. Reports have been recently made by schools which have been making careful attempts to estimate their accomplishment in this direction and to compare it with that of the traditional school. One or two reports are here presented as representative of many others the purport of which is similar.

Miss Elizabeth Goldsmith gives her experience and opinions as follows: ²

After seven years' experience in giving standardized tests at the Walden School we feel ready to state that there is no real inherent conflict between achievement of the tools of knowledge and spontaneous creative living in a school community.

Again, Eugene R. Smith,³ of the Beaver Country Day School, Chestnut Hill, Mass., who has been using stand-

² *Progressive Education*, April, May, June, 1928, p. 137.

³ *Ibid.*

ardized tests for nineteen continuous years to measure the subject-matter achievement in his schools, is able to state that:

The results of the tests have always shown that pupils trained in a "progressive" school environment held their own even in the most formal sides of school work. It is quite common for classes to have scores far ahead of expectation, sometimes reaching the standards for grades two or three years ahead, and in exceptional instances standing even higher than that.⁴

Conduct units of work are in accordance with the actual nature of the learning process. Modern psychology has given a new and clearer understanding of the learning process. It has studied and formulated the laws of learning. It has investigated particular modes of learning and made known its findings. The conduct unit of school work is in accordance with these laws and principles. This may be realized upon a consideration of them as they are set forth in what follows.

The laws of learning. The laws of learning as set forth by Thorndike have been already presented in Chapter II. Consider the way in which the laws of learning operate in a case where a child writes his name on a strip of paper to prepare a label for his portion of modeling clay. It may be shown that under such circumstances his learning activities when writing his name go on in accordance with the nature of the learning process as described in the laws of learning. In the first place, he felt the need for some distinguishing mark by which his clay could be recognized and differentiated from the clay of the other children. The consciousness of this need

⁴ Attention is called to the fact that many progressive schools have children of high average ability.

throws his organism into readiness to struggle with the unfamiliar letter symbols. Thus are the conditions described in the law of readiness fulfilled.

According to the law of exercise, bonds which are used are, other things being equal, strengthened. Thus the use of the bonds involved in writing the name are strengthened. It is to be noticed that these are the very bonds which teaching should strengthen. They are the bonds which are involved in a most important skill. The child who makes copy after copy of a label in order to get one which is at once legible and fairly neat, is merely fulfilling the law of exercise by developing that important skill, the signing of one's name.

How does the law of effect operate in such an instance? The child experiences that keenest type of satisfaction, satisfaction at finding that one's efforts to fulfill a need have been successful. A day or two later he discovers that, by means of this label, which he himself made, his teacher, his schoolmates and he, himself, may distinguish between his piece of clay and the pieces of the other children. His efforts have not been in vain. His writing has served a purpose. He is satisfied. The bonds involved in writing his name are strengthened.

This simple case may serve to illustrate the fact that when the subject matter is involved in a natural unit of conduct the learning process is cast in an ideal mold.

Motivation. We have been hearing much in recent years of motivation. This is probably due to the fact that true motivation has a very important bearing on learning. It has been defined⁵ as "the stimulation of a desire upon the part of the learner to master the subject matter presented."

⁵H. W. Nutt, *Principles of Teaching High-School Pupils* (Century Co., 1922), p. 109.

There is revealed in the use of this term in this sense a subtle tendency to a belief that school work is a de-vitalized something to which a motive must be added in much the same way as some people put sugar and cream in coffee to make it palatable. It postulates the subject matter and prescribes a certain form of treatment to make it appeal to the individual.

This was the method of teaching used in the *New England Primer*. The author of the text presupposed the subject matter. He decided for himself what it was that the children of New England should learn. Thus he was led to write:

Proud Korah's troop
Was swallowed up

Lot fled to Zoar
Saw fiery shower
On Sodom pour,

Moses was he
Who Israel's Host
Led thro' the Sea.

How remote from the life interests of little children. Yet there were many who read it. Remote as it was from child life, a motive could be supplied. Perhaps the fear of punishment, possibly the lure of the marginal woodcuts, perhaps the kind persuasion of the teacher. But this was a makeshift—an artificial way of teaching artificial subject matter. So motivation may become a mere device to cover a multitude of sins.

In other words the process of motivation may become an attempt to restore to the teaching process some semblance of life from which it has become far removed. This may be more clearly brought out by considering

the kind of advice given by writers on motivation. They suggest an appeal of usability. One writer says:

One of the most powerful appeals that can be made to the adolescent boy is the appeal of the usability of the subject matter studied. One of the remarks that is most commonly made by the high-school pupil is: "I don't see any use in studying history, Latin, etc.," as the case may be. The boy who expects to be a dentist can see the value that a knowledge of chemistry may have for that profession. The girl who plans to be a nurse can see the value that a knowledge of physiology and hygiene may have for that profession. The prospective mechanic can see the value of physics as an aid to mastering mechanical problems.

Here is a clear advocacy of an effort to indicate what relations the subject matter has to life. The subject matter has been isolated from life situations, and it is necessary to point out that it does have direct bearing on human conduct. The writer does not intend to criticize this type of teaching at this point. Rather does he wish to point out the type of situation in which motivation is used as a device and the nature of this process of motivation.

Another type of motivation is described which has the same characteristic. It is suggested that lack of interest in the subject matter should be overcome by an appeal upon a basis of social standing. The pupil who is lax in his studies in high school may be stimulated to continue by pointing out the social value of completing the high-school course. It is pointed out to the student that the course of study which seems to lack actual value really has practical life significance. The material which seems to have no present value in the pupil's life is shown to have future value of a practical importance. Although the subject matter has been

separated from any life situation, it is pointed out that it will actually function later in the outside world.

While it is readily admitted that such motivation is frequently necessary and valuable to school work it may also be pointed out that there is a type of school work which does not need to be in any special sense motivated. Whenever an activity is such that it fulfills a present need it does not have to be motivated. The motive is already inherent in the need. Charters⁶ relates the incident of a man who was unsuccessfully solicited for years by an insurance agent. When the man married he himself sought out the agent and bought a policy. In the earlier days the agent attempted to supply the prospective purchaser with an artificial motive. When the real need for the policy arose the motive was inherent in the need, similarly in the school. If the school activity fulfills a recognized need, no special effort at motivation is necessary.

Parker recognizes artificial implications of the term motivation by avoiding it altogether and relying on the word interests. Charters writes two chapters under the heading of motive which become, in reality, a frank discussion of interests and needs. Both writers recognize the fact that activities which are inherently interesting generate themselves.

In contrast with the quotation from the *New England Primer* given in a previous paragraph is the following story:

KING TAWNY MANE

There was once a lion whose name was Tawny Mane. He was so strong that all the other animals were afraid of him,

⁶ W. W. Charters, *Methods of Teaching* (Row & Peterson Co., 1912), p. 158.

so he was called the king of the forest. He liked to kill every animal that came in his way, and there was no living thing in all the land that was safe from him.

At last one day, all the animals met to talk about their troubles, and see if they could not find some plan to save themselves from King Tawny Mane. They talked a long time, and then agreed what to do.

In the evening they went together to the lion's den. King Tawny Mane had just had a full meal, so he did not try to harm any of them. "What do you want here?" he roared.

This frightened them very much. Some of them ran back into the thick woods. But the bravest stood still. "Speak and tell me what you want," said the king.

Then Sharp Ears, the fox, stood up and spoke. . . .

It would not be difficult to persuade a child to read the story which follows these opening paragraphs. In fact even the adult reader may feel slightly irritated at the abrupt discontinuance of the story here. There is no necessity for any definite attempt at motivation, such as the furnishing of woodcuts or the persuasive voice of the teacher. The reading of the story is a natural life situation for a normal child. To it the normal child will readily respond. Motive would be soundly and surely supplied if the proper situations were arranged.⁷ "The teacher should be skilled in so arranging educative situations that the student will lay hold vigorously upon the experiences provided and will reach out after more."

A teacher may spare himself the expenditure of the energy demanded in artificial motivation by taking the trouble to provide conduct units of a suitable kind.

Organization of subject matter by the pupil. The organization of materials is essential to rational and definite conduct. The man who would build a bridge

⁷ E. L. Thorndike, *Principles of Teaching* (A. G. Seiler, 1906), p. 337.

must first organize his ideas in a plan, then his materials. The housewife who prepares the midday meal must similarly organize her ideas of the meal and then the foodstuffs themselves. The child who would build himself a four-wheeled cart must also organize the material which he uses. In each case the more careful and thorough the organization of ideas and objects the better is the finished product. The learning process which prepares for life should, therefore, give training in the organizing of ideas and things.

Heckert points out that not only adults but children also organize under the stress of a vital problem. He gives the following example: ⁸

Three little girls were seated on a window seat looking out of the window. One of them quite accidentally spilt a box of buttons. A boy, *D*, eight years old, who had observed the spilling of the buttons, immediately insisted that *P*, the little girl, pick them up; *P*, however, refused to do so. How can she be made to pick them up? She wants to continue to look out of the window with the other girls; he therefore attempts to prevent her from doing so by pulling the shade. But this is a matter of indifference to her since her companions also suffer the same punishment, and she tells him so. *D*, therefore tells the two girls not concerned in the difficulty to go to another room to look out. When they do so *P* attempts to go with them but is headed off by *D*. She then picks up the buttons and is permitted to leave the room.

Under the stress of the problem of getting the little girl to pick up the button the boy took the organization of affairs into his own hands and so changed the situation that he attained his desired end.

The child who pursues the set organization of a given

⁸ J. W. Heckert, *The Organization of Instruction Materials* (Teachers College, Columbia University, 1917), p. 33.

subject as it is set forth in a textbook does not perform any such organizing activities. He organizes when he is engaged in some unit of conduct which arises from a problem of vital significance in which the subject matter of the lesson is concerned. Note the way in which the conduct unit in the following lesson arises from an intellectual problem of significance to the learners, and the way in which the organization of material is made by the pupils themselves.⁹

EIGHTH-GRADE GEOGRAPHY LESSON

Subject Matter to Be Studied

1. The dominating trade centers of the United States.

The curriculum prescribed this. The teacher was bound to cover it satisfactorily.

2. The origin of the problem.

A problem was suggested by one of the pupils in the following form. *Why is the trade of New York greater than that of San Francisco?* When presented to the class it appealed to them as worthy of study and was adopted by agreement as a problem to be solved.

3. The attack upon the problem was preceded by a discussion. Herein is the first instance in which organization of ideas by the pupils goes on. It resulted in the following program by the pupils.

- I. Things we need to know before working our project:

1. Value of trade in tons and money
2. The location of the two cities
3. The kinds of harbors
4. Position
5. Good railways
6. Transportation on water
7. Articles of trade

Discussion of this outline would reveal that it could be made less cumbersome. It was finally revised.

⁹The report of this lesson is adapted from a lesson described by Lull and Wilson, *op. cit.*, pp. 102-109.

Revised Outline

1. The value of trade in money and quantity of trade in tons.
2. Description of the two harbors.
3. Position of the two cities with reference to our country; to foreign countries.
4. Articles of trade.

4. With such a program before them the class turned over the four topics to certain individuals for report. Four different pupils were asked to report, one on each of the four divisions of the outline. In making these reports the students would be expected to consult individuals or any available material in the school library or elsewhere. Their preparation affords exercise in the collection and organization of data.

Original Outline of Report by Marley Thompson

2. Description of the Two Harbors

New York

- a. Average depth of New York harbor is 50 feet.
- b. Deepest place is 67 feet.
- c. Shallowest place is 18 feet.
- d. No sandbars.

San Francisco

- a. Average depth of San Francisco's harbor is 30 feet.
- b. Deepest place is 126 feet.
- c. Shallowest place is 2 feet.
- d. Quite a number of sandbars.

Rules for good harbor

- a. Vessels should have 30 feet of water to float with ease.
- b. Harbor should have sufficient area—several square miles.
- c. It must be locked, so that a vessel can ride at anchor safely.
- d. It must be tideless or nearly so.
- e. The deep water must extend to the shore.

Facts regarding New York Harbor

- a. Great piers have been built on the New Jersey side as well as the New York side of the harbor.
- b. The port of New York has 450 miles of water front. 125 miles of which the largest steamer can navigate.

After discussion and criticism by the class the outline was rearranged. It is to be observed that here the whole class has an opportunity to discuss, suggest, contribute, and organize. The rearranged outline appeared thus. Note the references added.

1. *Rules for good harbor* (as above)

2. *Depth.*

a. *New York Harbor*
(data as above)

b. *San Francisco Harbor*
(data as above)

3. *Added facts*

References:

a. Tarr and McMurry: *World Geography*, pp. 37 and 125.

b. *Great Cities of the United States*, pp. 32 and 230.

The remaining work of the class on this topic was of a similar nature and is reported as follows:

5. Position of the two cities with reference to our country; to foreign countries.

New York is situated as a natural market for our manufacturing states and cities. The port is within short distance of our oldest and most densely settled region. It is situated on the Atlantic, toward which all of our trade has tended for years. It is directly opposite the great commercial countries of Europe. There is a direct waterway to South American ports. The distance across the Atlantic is short.

San Francisco is situated a little south of the middle of our western coast. The position is good for trade with other Pacific states. However, this city, up to the present time, has had difficulty in trading with European countries; the Panama Canal has helped and will help more. San Francisco faces the Orient. This is a disadvantage, in that the Oriental nations have not been great commercial nations. The distance to Oriental countries is much greater than to Europe.

References:

1. *Essentials of Geography*, pp. 86 and 182.

2. *World Geography*, pp. 37 and 125.

3. *Great Cities of the United States*, pp. 30 and 230.

Note. No revised outline was made of the above report.

Original Outline by John Robert Groh

4. Articles of Trade

- a. *San Francisco*: San Francisco is the greatest city in the United States for the shipment of wheat. It also ships cotton, canned goods, oil, barley, prunes, flour, dried fruits, leather, machinery, lumber and corn products. The steamers coming in are loaded with raw silk, coffee, tea, copra, nitrate of soda, tin, sugar, rice, cigars, coal, burlap, vanilla, cheese and Manila hemp. Copra, the main export from Samoa and from many Pacific islands, is the dried meat of cocoanut. It is of value for food and for oil.
- b. *New York*: The leading imports of New York are: rubber, silk goods, furs, jewelry, coffee, tea, sugar, and tin. The most important exports are: cotton, meats, and breadstuffs. Added to my own list, corn and manufactured goods.

References:

1. *Great Cities of the United States*, pp. 32 and 231.
2. *Essentials of Geography*, pp. 87, 178, and 180.
3. *World Geography*, p. 187.

Note. The above study was not revised because it had so little value in relation to the main project.

Original Outline by Evelyn Gceslin

5. Sources of Materials or Territories Supplying Articles

- a. *New York*: New York is located in the midst of a great manufacturing region. It gets material from New England and from the Great Lakes region. From the Great Lakes region the materials are carried through the lakes down the canal to the Hudson, and also by many railroads leading to New York. It gets trade from almost all parts of the United States. It exports cotton, raw and manufactured, to England. New York imports chemicals and drugs of different kinds from Germany. It also imports tin and iron from Australia; rubber and coffee from Brazil.
- b. *San Francisco*: San Francisco carries on slaughtering and meat packing, which are very important industries. It also has a great shipbuilding plant. It imports iron.

The surrounding country is engaged in agriculture. San Francisco is the opening for the great California valley. The two principal rivers are San Joaquin and Sacramento.

References:

1. *Great Cities of the United States*, pp. 32, 39, and 222.
2. *World Geography*, p. 126.
3. *Essentials of Geography*, pp. 87, 89, 175, 179, 180.

(*Note.* The class added to Evelyn Geeslin's report the following facts, which are much more significant in relation to the main project than her report.)

Cattle and their products are shipped from beyond the Mississippi to New York; immense quantities of grain are sent there from the great agricultural states of the Mississippi valley. New York is the chief market place of our country, because the largest part of our country is connected with it by railroads and waterways.

San Francisco draws trade from a much smaller area in our country. The foreign countries with which she trades do not demand things in such large quantities.

Original Outline by Edward Potts

6. Ease of Transportation

- a. The east is more densely populated than the west.
- b. This makes a great demand; hence greater transportation.
- c. Railroads are more easily laid than in the west.
- d. The civilized world is on the east. America was discovered in the east.
- e. Four railroads run into San Francisco, as against twelve running into New York.
- f. New York is the financial center of the United States.
- g. The Erie Canal connects New York with the Great Lakes and the St. Lawrence River.
- h. New York has a population of 5,000,000; San Francisco 400,000. New York is the first city in size in the United States; second in the world.
- i. New York carries more than half of our foreign trade and leads all cities in manufacturing, and has one of the best harbors in the world.
- j. New York has wonderful underground, elevated, and surface systems of transportation.

- z. San Francisco is the eleventh city in size in the United States and has one of the finest harbors in the world; also the chief city for trade with the Orient, and leads all cities of the United States in exportation of wheat. There are also many great canning factories in California.

References:

1. *Essentials of Geography*, p. 87.
2. *Great Cities of the United States*, p. 28.
3. *World Geography*, p. 37.

Note. No revised study was made of the above report.

When all the reports were completed as here described the class drew conclusions. Thus a final organization and summing up was made.

Our Conclusions

1. The total trade of New York is fifteen times that of San Francisco in money value; the tonnage is thirteen times that of the latter city.
2. The average depth of New York Harbor is greater; its water front and area is much larger than that of San Francisco, and therefore can take care of more boats at once.
3. New York is the outlet of a great manufacturing region, which always means much trade. San Francisco is the outlet of a great agricultural country.
4. San Francisco is not the outlet of a great water route, while a great per cent. of New York's trade comes by way of the Great Lakes and Erie Canal.
5. New York faces the great commercial nations of Europe, while San Francisco faces the more backward nations of the Orient.
6. New York is the great distributing center for our country.
7. The territory supplying New York trade is many times that of San Francisco; New York draws trade from at least three-fourths of our country. San Francisco is far from the center of population, and the greater part of her trade is limited to the country west of the Rocky Mountains.

The description of this lesson has been given here with the intention of making clear the way in which conduct units of school work provide for organization on the part

obvious relation to the life activities of boys. Such pieces of work being chosen, the boys set to work to complete them. A single example will serve to show the way in which individual initiative was exercised in the making of the object chosen.

Raymond came to the teacher in eagerness. "May I make a pair of skis?"

"Certainly, why not?" was the reply.

This was the teacher's first word with Raymond on the subject. He had, on his own initiative, picked out from the *Outdoor Book for Boys* the things which he wanted to construct. His friend and he had decided in conference that each would like to have a pair of skis. The next question was, "Where will I get the wood?"

"At the mill. What do you want?"

"I don't know what kind of wood."

"Find out what kind of wood you want and how much. Then tell me."

It was soon discovered that the wood required was of such a length, such a thickness and should be either oak or ash. The boys were then sent off to the mill to price the material. In fifteen minutes they returned with the price of the wood and the required iron bolts. They were given the money to secure their material. They went off again and returned with their wood and the change. They then set to work and carried out the various steps of construction in successive periods, beginning each day where they left off on the previous day.

It is quite obvious from this description that all that was done by the boys was done on their own initiative. Throughout all this construction work the teacher did nothing but act as a consulting director. Whatever practical problems arose the boys were directed to solve them in their own way. Thus they struggled along with a real

unit of living, doing all within their power and receiving help only in such necessary things as the cost of materials, the suggestive directions in print, and some slight assistance in problem solving which became too difficult.

The learner's dominance of the learning process. To say that the learning process should go on under the dominance of the learner is but a new way of expressing the well-established doctrine of self-activity. It was clearly taught by Froebel that true learning was that which was under the inner control of the individual, that in which the learner and not the teacher took the initiative. There is no short cut or easy road to learning, the teacher cannot do the work of the student, for in order to gain the mastery the student himself must bear the burden and heat of the day. Parker¹⁰ illustrates this as follows:

Thus in acquiring motor skill it is obvious that the student learns through doing—for example, by actual practice in tossing balls or using the typewriter. However, it is not simply the physical act that develops his skill, but the mental control. A student would make little progress from simply having the teacher hold his (the student's) hands or fingers and put them through the movements. This is evidence to a learner when some one tries to teach him a tennis or golf or swimming stroke by guiding his arms. It may help somewhat in enabling the individual to recognize the desired movement when he succeeds in making it by trial and error. This was shown by Bair's experiments on electrically stimulating the movements of the ears. But such a stimulation did not enable the learner to proceed to make the movement. It did help him to recognize and select it after he had succeeded in making it as the result of trial and error. In general, the mental impulse to the move-

¹⁰ S. C. Parker, *Methods of Teaching in High Schools* (Ginn & Co., 1920), pp. 297-298.

ment and the critical evaluation, by the learner, of its form and result are the important factors in acquiring motor skill and are clear illustrations of the principle of self-activity.

The writer goes on to show that it is not only in the acquirement of motor skill that the learner should dominate the learning process. This is equally true in such varied activities as learning a vocabulary, reflective thinking or reasoning in such subject matter as geometry, acquiring habits of enjoyment, such as the appreciation of good literature and art, and learning to express one's ideas in clear and creditable language.

A speaker in a recent meeting of the Michigan State Teachers' Association gave an interesting illustration of school procedure which, though simulating the aspect of good classroom work was really lacking through neglect of the principle of self-activity. The speaker related an experience in supervising the work of a certain teacher in training in one of the lower grades. The student teacher was directing the construction activities of a child who was engaged in the making of a toy cart. The child needed spools for wheels, the student teacher sought them out. The child attempted to drive a nail, but it was crookedly done, the teacher did it for him, he wanted a string, the teacher crossed the room and secured it for him. So did this student teacher faithfully wait on the child and supply each need as it arose.

At the conclusion of the performance the supervisor quietly drew the attention of the student teacher to the situation. What had the child learned? Chiefly this, that its needs could be supplied without effort by shifting the burden on some one else. It had learned the lesson of dependence instead of the lesson of independence. The teacher had become the servant of the child instead of his helper and guide.

How unnecessary was any such condition of affairs. The very self-same activity in which the child was engaged might have been a most useful educational act. In reality it afforded an excellent opportunity for the child to dominate the learning process. Here was an act well within the child's personal sphere of interest and accomplishment, the completion of which might have contributed to his mental and motor control and developed self-reliance and strength. Thus may a conduct unit if wrongly directed become a useless thing, but properly directed may fulfill one of the most fundamental essentials of learning.

Provision for individual differences. One of the newcomers to clamor for the attention of the educational world is the matter of individual differences. Recent investigations in inheritance of mental characteristics have indicated very wide differences both in general and particular characteristics of people. Much evidence has been submitted in recent years to support this fact. It may not be out of place to present a small portion of this evidence by way of illustration.

The wide differences which may occur in that general fixed capacity called intelligence may be realized by a consideration of the following:¹¹

Superior children. Tasso enjoyed a certain amount of fame at eight, Southey wrote dramas before he was eight, Mozart took piano lessons at three, played minuets and composed short pieces at four, and gave a public recital at five. Macaulay read widely at three and at seven he began a compendium of universal history.

¹¹ From C. R. Griffith, *General Introduction to Psychology*, pp. 295 and 298. By permission of The Macmillan Company, publishers.

Dull Children. Abbie was small, left-handed, and awkward. She always put the same foot forward when going upstairs. She knew letters but could not read; she could count to ten; she knew some colors and forms, sang a few hymns learned at home. She had normal sight and hearing, was fond of play, but had a bad memory, and poor power of imitation. She was gluttonous, untidy, untruthful, shy, and profane.

Three months after admission to the hospital she could read "A man ran" and "I see a man," thread a needle, sew buttons, count to twenty, and do very simple additions such as:

$$\begin{array}{r} 1 \\ 1 \\ \hline \end{array} \qquad \begin{array}{r} 1 \\ 2 \\ \hline \end{array} \qquad \begin{array}{r} 1 \\ 3 \\ \hline \end{array}$$

After ten years in school she was still small; but she could make a bed, and iron an apron. She could not count the cost of three one-cent stamps and three two-cent stamps with the stamps before her nor repeat five figures or a sentence with fifteen words. She was able to write about twenty-five words from memory; she knew the days of the week but not the months of the year. She did not know how many fingers she had on both hands.

Between these extreme cases range all degrees of capacity, the largest number of people falling near the normal or average about half way between these extremes.

But not only are differences found in such general capacities as intelligence but likewise in specific capacities. Differences of similar ranges and similar normal distribution are to be found in such definite capacities as those for Latin translation, the solving of problems in algebra, the solving of problems in arithmetic, the ability to spell and the rate of reading. In fact, these differences are to be found in each and every trait which an individual possesses. This is of great significance in the schoolroom.

Roughly speaking, the teacher of a class, even in a school graded as closely as is possible in large cities, where two classes are provided in each building for each grade and where promotion occurs every six weeks, will find in the case of any kind of work some pupils who can do from two to five times as much in the same time, or do the same amount five times as well, as some other pupil. The highest tenth of her class will in any one trait have an average ability from one and three-fourths to four times that of the lowest tenth.²²

In the light of such extensive individual differences it is clearly necessary to arrange some method of school procedure which will be flexible and variable so that it may correspond to the flexibility and variability of human nature.

It is, however, one thing to demand such a method of school teaching and another to find it. It is quite obvious that no matter how carefully one endeavors to meet the problem of individual differences his efforts must be far from reaching the ideal. Nevertheless, it ought to be obvious that any formal method of teaching must be the farthest removed from the actual demands of the situation. It can scarcely be said that the organizing of school life in terms of conduct will be a *simple* way of making provision for individual differences. It may perhaps be claimed, however, that it is, if not the only way, nevertheless, the best way. What is there which so well corresponds to the variableness of human traits as their counterpart in human conduct? Although the recognition of this truth by no means solves the problems, yet may it not indicate the way in which their solution may be attempted?

The following description of a lesson set forth by

²² E. L. Thorndike, *Principles of Teaching* (A. G. Seiler, 1906), p. 73.

Miller¹³ helps to make clear the way in which a conduct organization may make adequate provision for individual differences. The unit of work, which extended over a number of class periods, was one in tenth-grade mathematics in the field of demonstrative geometry. The class contained thirty-eight pupils of very wide range of ability and achievement. The appeal was made to this group in the form of a challenge, expressed as follows:

Challenge—The Circle

(Material, the best modern texts—Book II.)

It may be pointed out that this is a unit of conduct of a valuable kind, the rational mastery of a fundamental geometric concept and of its relation to other mathematical concepts. It none the less is a unit of conduct because it is mental rather than motor. The work was not, however, presented in fragmentary form as a set of worked-out exercises to be mastered in logical order as set forth in a text. It was rather presented as a personal intellectual problem to be studied and mastered in its various aspects. When once the challenge was sent forth, the various members of the class attacked the problem and continued working on it for about six weeks. The challenge, or organizing principle was broken up into four or five major organizing principles. Thus, the whole divided itself into several divisions of value in thinking out the problems. These were:

1. A radius perpendicular to a chord
2. A radius drawn to a tangent at a point of contact

¹³H. L. Miller, *Directing Study* (Charles Scribner's Sons, 1922), p. 15.

3. Measuring angles, angles measured by the same number of arc degrees
4. Parallels intercepting equal arcs
5. Loci problems—a few clarifying principles

Several characteristics of the way in which this work proceeded will help to make clear its provision for individual difference:

1. The class period of seventy minutes was a work period, something in the nature of what is called supervised study.
2. Class members continued to work outside of class on their own initiative.
3. Special clinic periods were held on Saturday morning.
4. Supplementary activities were supplied for the fast workers, for example, students who mastered the part of a challenge worked out original exercises not worked by the slower ones.
5. The teacher acted as a consulting expert. On an appeal for help he would respond after this fashion.

"What are your data? State each point in your hypothesis."
 "Draw your figure with your instruments."
 "Trace the angle with your finger as you read it."
 "Where is the vertex of an inscribed angle?"
 "Express the arc degrees. 360-arc A.C. Now try it."

A clearer and fuller account of this lesson is given by Miller,¹⁴ but even from this brief account it should be clear that the arrangement of the class work into significant elements of conduct made it possible to find a valuable correspondence between the capacities and differences of the various students and the related elements of activity.

Incidental learnings. When an individual carries out any such activity as the drawing of a map of his own

¹⁴ H. L. Miller, *Directing Study* (Charles Scribner's Sons, 1922).

neighborhood the things which he learns are of different kinds. In the first place he learns directly to accomplish his *primary* purpose of making a map of his neighborhood. Kilpatrick has pointed out that this is not the only thing which any such person learns. He may learn in addition several valuable things which he has not known before. He may learn that there is a grocery store in the next block which is much more conveniently situated than one he has been patronizing. He may gain a knowledge of how to use colored crayons and develop some skill therein, he may learn a form of printing which he has not previously learned. Such learnings Kilpatrick¹⁵ has termed *associates*. In addition to such associate learnings the individual in carrying out his process of map making may gain impressions of a wider kind. He may learn that map making is a tedious occupation, he may learn that there is satisfaction in labor carefully done, he may discover that he has many friends in the world who are willing to help him. Such developed generalizations as these have been called *concomitant* learnings. They are those wider feelings and attitudes which are built up while one is engaged in the regular tasks of the day.

It may readily be seen that any method of teaching should secure the development not only of the primary but also of the associate and concomitant learnings. To teach a child to solve a problem is not enough, he should also learn as an associate to coöperate with others in the solution of problems. To teach a child to master his arithmetic questions by coercion and excessive punishment may breed dangerous concomitants in the form of

¹⁵ W. H. Kilpatrick, *The Project Method* (Teachers College, Columbia University, 1921), p. 9.

ideas of rebellion. Excessive compulsion may even accomplish its primary aim in securing mastery of a certain amount of subject matter and at the same time leave the child with an unhappy and bitter outlook on the world which is too high a price to pay for the mastery of some skill in computation or communication.

The teacher who organizes her work in the form of units of conduct makes provision for the proper development of both *associate* and *concomitant* responses. A child cannot carry out any piece of work which fulfills a real felt need, such as the making of a schoolroom chair from an orange crate, without learning much about tools and under the guidance of a skilful teacher, much about oranges and the country they come from. In addition to such associates there may be in a cheerful schoolroom with a cheerful teacher many useful concomitants. Perhaps the child may learn that there is satisfaction in doing something for the general good, that he too can do something that is worth while, and he may even gain some fleeting impression of the fact that this world is a happy place to live in after all.

Good health. Primary to all learning is the possession of good health. Any school procedure which is detrimental to the health of school children is by that one indictment alone deserving of banishment from the schoolroom. But how is one to provide better for the health of the school children than by healthy outdoor play and the provision of school work which enables them actively to pursue their needs and purposes in ways which are normal and good. The kind of school teaching which is here advocated is as far from the old sedentary and inactive form of school training as it can be. In fact, the more of healthful activity indoors, but

especially outdoors, that it involves, the nearer does it approach to healthy right living.

It is hoped that by this time it has been made clear that the organization of school work in terms of conduct comes very close to fulfilling the demands of the learning process. It is probably impossible to devise any ideal way of teaching. The best that can ever be done will be to teach in ways which violate as little as possible the clearly established characteristics of the process of education. At any rate, what has been set forth in this section should serve as an outline of many of the desirable ends which the teacher hopes to attain and to indicate ways in which those ends may sometimes be accomplished.

Conduct units serve as a medium for moral training. One of the foremost problems in education to-day is the matter of character education. Everywhere churchmen and educators are reiterating the fact that whatever else is accomplished by the schools they should develop men and citizens of fine moral character, or all other training will be fruitless and so much waste of energy. There can be no doubt about the fact that these claims are just. Any method of school teaching worthy of the name should make provision for moral training. A consideration of certain fundamental ideas concerning the nature of moral education will be helpful in indicating just what type of school work is suited to further it.

Ideas about morality do not necessarily function. In the first place, it should be clearly understood that a knowledge of what is right does not necessarily produce right conduct. The great Socratic fallacy lay in the statement *knowledge is virtue*. To-day few things are clearer than that such a statement is not correct. A man may have very well defined ideas upon the matter of

stealing and nevertheless burglarize his neighbor's house. He may have very definite ideas about honesty and nevertheless avoid paying his carfare. Ideas about morals do not necessarily function to produce right conduct.

In spite of this easily recognized fact a great amount of time has been spent in the past, and it is probably fair to say is being spent at present, in attempts to teach morality directly. By teaching morality directly is meant the teaching of moral precepts in the hope that they will "take," in the hope that they will pass over from the realm of knowledge into that of action. Thus it is hoped that drill in the memorizing of precepts will build character, that practice in the repetition of moral codes will produce good conduct.

Such attempts are neglecting to take into the consideration the fact that the adjective *moral* is properly applied to acts, not to ideas of acts. In other words one should not say that a certain individual is a moral man because he sits in his easy chair in front of the fire of an evening and remarks on the fact that a person who borrows a book from a friend should be very scrupulous about returning it. The moral man is that infinitely rarer individual who actually does return his borrowed books. It is a man's acts which constitute his character, not his ideas upon what constitutes right conduct.

It is not intended here to maintain that ideals of conduct are without force. Voelker¹⁶ has shown somewhat conclusively by scientific investigation that they have a degree of potency. Ideas of conduct, however, are not necessarily ideals of conduct. Furthermore, training in the building up of ideals of conduct is best ob-

¹⁶Paul F. Voelker, *The Function of Ideals and Attitudes in Social Education* (Teachers College, Columbia University, 1921).

tained and should be freely supplemented by actual training in doing what is right.

Since character is a matter of action rather than of reflection it is produced by training rather than by instruction. The best way to develop good character is by the giving of practice in right action in accordance with the laws of learning. In the practical everyday life of the home this is the method that is pursued. The child is expected to assist in the activities of the home, he who does well is encouraged and praised, the delinquent is punished. After all the maxim "Spare the rod and spoil the child" is but the proverbial form of the law of effect.

True character training seeks rather to build moral habits than to furnish moral ideas. Consequently the school, in attempting to make its contribution to the character building of its pupils, ought to provide training in the building of proper mental, physical, and social habits. The building of such habits can only take place in conjunction with action on the part of the pupils, consequently true character training can only be given in relation to student conduct.

Thus we come to the somewhat surprising idea that character is a by-product of the everyday activities of life.¹⁷

It seems certain that some of the greatest moral lessons are learned as a by-product of the regular activities in and about the school. In other words, we can learn how to act in a social way not merely by the direct study of what constitutes good conduct but also by the practice of good conduct in all the activities of the school. The school recitation offers oppor-

¹⁷ Character Education Methods, *The Iowa Plan*, Character Education Institution, Chevy Chase, Washington, D. C., 1922, pp. 18 and 19.

tunities which are unusually rich in their possibilities for wholesome moral training.

Many of these possibilities have been realized in the socialized recitation. The essence of this method is that it be conducted in such a way as to duplicate conditions under which people work in life outside the school, and so train pupils in proper coöperation and in right attitudes toward each other. There are several conditions which must be provided if the socialized recitation is to make these contributions. First, the class must work upon a problem which they feel to be socially worth while. This may seem but one way of stating the fact that the pupils must take the problem as their own. It really involves more than this. The pupil's motive for attacking the problem must arise from his recognition of the importance of the solution in life outside the school. Such a problem is almost certain to have a moral setting. The second requirement is that the class, in solving this problem, work coöperatively much after the manner of the committee of the whole. This involves a feeling on the part of every pupil that not only he, but every pupil in the class is responsible for giving his best efforts to the attempt to secure a satisfactory solution to the problem at hand. The third requirement is that much of the initiative for the formulation of the problem and for suggesting steps for its solution shall lie with the class and be accepted definitely as their responsibility.

The following illustration serves as an example of provision in the school for the carrying of moral ideas into action. Teaching of this kind ties up the instruction in the school with practical situations in life and so is a valuable method of character education.²⁴

A group of primary children, having noticed that the lawns in the vicinity of a school were being spoiled by students who were cutting across lots, decided to take for their responsibility the job of protecting these lawns. Their work consisted not

²⁴Character Education Methods, *The Iowa Plan*, Character Education Institution, Chevy Chase, Washington, D. C., 1922, p. 23.

in the discussion of what might be done, but in the making of plans which were to be executed by them. They made signboards, upon which they printed such signs as "Please, Help Save the Grass," "Don't Spoil the Lawn." If such a training could be given for meeting all moral situations the problem of moral education would be essentially solved.

From the foregoing it will be readily realized that the very method of teaching which has been advocated in the previous pages is especially well adapted to the requirements of a sound type of character education. The accompanying chart¹⁹ helps to give concrete examples of units of school work which enrich a character training curriculum. When the activities of the school partake of the nature of life itself, moral issues must arise. Moral issues in the schoolroom are opportunities for the training of character.

Conduct units prepare for life situations. Life situations are very complex and varied. A training which is to prepare for life in the world must, in similar fashion, be varied and complex. In the schoolroom where the work is organized into life units the complex needs of life arise and are met in concrete imitation of life in the outside world. Thus the best possible training for citizenship is provided.

Many of the failures in living which embarrass mature men are due to their inability to carry through a complete act. Errors of living may result from failure to carry on any of the five steps properly. How much failure in the world has been due to the initiating of acts in response to a false need? Do all the individuals who buy automobiles need them as much as they need

¹⁹ Character Education Methods, *The Iowa Plan*, Character Education Institution, Chevy Chase, Washington, D. C., 1922, p. 23.

other things? Must the young married couple begin to live on the scale of their parents' homes? Is it necessary to choose between purposes? How many of the surprising number of business failures are due to inadequate and shallow planning? Do we give up our cherished plans through weariness in their execution? Are we fair and impartial critics of our own actions? Incapacity to carry on the complete act in truly balanced fashion is a common defect of the ordinary individual.

If the schools train children to carry out units of conduct in a properly balanced way they will be better prepared to meet the actual problems of life. The child who has properly experienced the modes of living actually involved in the building of a doll's house has received true and valuable training for the essentials of world mastery. The child who is informed of the fact that careless planning will be followed by unfortunate results does not learn that fact so well as he would from experiencing the failure of certain of his own cherished plans.

PROBLEMS FOR CLASS DISCUSSION

1. An elementary-school class visits the auditorium of the school and sees a moving picture of an Arctic or Antarctic expedition. Discuss this lesson in terms of each of the values presented in this chapter.

2. Supposing that after the picture has been viewed various classroom activities are based on it, such as stories, discussion, reading of books and articles on the Arctic, making of model planes and dog sleds and so on, which of the values in this chapter might be secured?

3. Discuss the use of the radio in the classroom. How may it be used to little advantage? To good advantage? The British Broadcasting Corporation issues special illustrated pamphlets for use in connection with broadcasts to schools. Discuss.

4. Give examples of school activities which seem to you to

be specially suitable for the obtaining of the values indicated in this chapter. Give a separate example for each separate value.

5. Choose some incident from your own school career and discuss the incidental learnings.

6. Discuss the incidental learnings involved in "cramming" for examinations.

7. Discuss the incidental learnings involved in regular daily preparation of assignments.

8. In terms of the material of this chapter discuss the following well-known saying:

Sow a thought, reap an act;
Sow an act, reap a habit;
Sow a habit, reap character;
Sow character, reap destiny.

OUT-OF-CLASS ACTIVITIES

1. Make a study of a number of individuals with relation to their individual differences in some one trait or other, such as the time it takes them to solve a simple puzzle, the number of words they can read in a minute, their knowledge of the names of Shakespeare's plays.

2. Look through the literature of modern school teaching and consider some reported lesson in relation to the values discussed in this chapter.

3. Look through recent issues of the magazine *Progressive Education*. Information concerning the Progressive Education Association will be sent to those who write the association at 10 Jackson Place, Washington, D. C.

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CHAPTER IX

VITALIZING THE TEACHING PROCESS

Vitalized teaching can never become monotonous. The teacher who finds monotony creeping into her work will find that it is the monotony of routine, a routine that should never have been established. School teaching should be as variable an occupation as variable human nature. No school year should be identical with any other school year, no school day should be exactly like its yesterday. The minutes of a schoolroom hour should be as unlike as the leaves of a tree, as the waves of the ocean.

The factors which condition the teaching process are constantly changing. In the first place, the environment in which teaching goes on may differ for the individual teacher from year to year. This year she may be in a rural and an ungraded school, the next she may be in a city-graded school. Now she may find herself in the crudest and most unsatisfactory of buildings but later she may hope to teach in the most modern of school-rooms. Each group of children which she teaches will be different from another group, each child will be different from his neighbor, and furthermore each child will be different by the day and by the hour. As if this were not enough the teacher herself will vary in her moods and interests, in her strength and spirit. To be governed by these infinite changes in the determination of the work of the hour the teacher must be alive

to a situation which is far from monotonous. To be successful in mastering such diverse elements, in harmonizing them into a satisfactory working process will demand endless adaptation, and change in ways of doing things.

Relative values in teaching. All values are relative. One cannot hope to obtain all values in the fullest degree. One must be sacrificed to another. Thus it is that the painter must continually sacrifice one value to another. The impressionist Monet, being particularly anxious to obtain certain superior effects of luminosity in his canvases, used a special technique by which the paint was applied to the canvas in splotches or daubs of color, and the blending left to the eye of the spectator. By so doing he sacrificed, to a large extent, the pictorial character of his works, inasmuch as it is necessary to recede some distance from them before the proper effect can be obtained. On the other hand, he gained in power of representing the subtle variations of lighting so characteristic of natural scenes, which change from hour to hour, and so was able to paint his famous series of representations of the "West Front of Rouen Cathedral," showing it under the varying light effects of early morning, of full sunlight, of fog, and so on. In contrast may be mentioned the work of certain Dutch painters, such as Hals or Metsys, who sometimes strove after an effect of minute representation. They painted with finest accuracy the intricate patterns of a bit of lace on a cavalier's collar or the very words upon a missal. The effect of accuracy in representation was obtained at a sacrifice in true pictorial quality. In the case of either type of painter some one thing had to be sacrificed to some other, and the technique which the artist used was adapted to the obtaining of the desired end.

Relative values are quite as important in the art of teaching. It is just as impossible to obtain all values in the art of teaching as it is in any other art. The teacher must be prepared to judge between the various elements of a teaching situation and so modify her actions as to make the most possible out of the particular case of learning which she is directing. Thus the teacher would be called upon to use her judgment should such a case as this arise. Suppose that a very shy and backward child, who has for long hesitated to answer a question in class, finally does break through her reserve and answer a question but, in so doing, gives the wrong answer. What is the teacher to do? Shall she ignore the fact that the answer is incorrect and thus encourage the child to speak out, or shall she save the class from error on the point under discussion at the expense of the timid child's development? Under ordinary circumstances, other things being equal, the good teacher would probably choose the former alternative and seek for other means of righting the class in the matter of the error of truth. Whatever she does, however, it is evident that relative values are here involved, that the teacher is bound to sacrifice one value to gain another.

It is very important that the teacher should realize this fact that the value of a given response varies according to circumstances. Not only is such a realization necessary to intelligent and vital teaching, but such an understanding or lack of it may mean success or failure. The beginning teacher who takes over an unruly and ill-trained class and attempts to carry on high-class teaching to obtain first-class results is doomed not only to disappointment, but possibly even to defeat. It may be necessary in such a class to use methods of control which the best maxims of textbooks and educators would

never sanction. It may be necessary to abandon all attempts to cover the regular work of the curriculum and to devote all energies to the establishment of control and the enforcement of order. When this primary gain has been made, the teacher may then take in hand the training of her class and cover the regular work of the school, at the same time developing a spirit of orderliness which may become the basis for a more approved method of teaching. Thus may a teacher find it wise to call forth responses of which she does not really approve so that she may obtain essential values which would otherwise be unobtainable.

A teacher may also fall into error in an attempt to mold her work in accordance with some approved pattern. Thus the teacher who blindly attempts to follow out the five Herbartian steps may be bending her efforts to evoke responses which are of little value and quite aside from the point. Witness the case of the teacher who attempts to teach a lesson in literary appreciation of such a poem as Celia Thaxter's "Sandpiper" in accordance with the five steps of (1) preparation, (2) presentation, (3) association or comparison, (4) generalization, and (5) application. She flounders through some kind of attempt at preparation by asking the children if they have ever seen a little sandpiper running about the beach, and possibly by showing them a picture. The presentation goes on smoothly enough by a pleasant reading of the poem. Then follow the attempts at association, worse still, of generalization, until the general exhaustion becomes so great that the last step of application is fortunately never reached at all. All such blind leading of the blind serves but to stimulate certain intellectual development on the part of the children which, even though necessary, is ill-timed; worse

still, it neglects to obtain the much desired emotional response and cannot but fail to bring about true spiritual development through a revelation of the beauty of nature.

Another type of error which may be an outcome of an inadequate appreciation of relative values is that in which some psychological element of the learning process is seized upon and a given lesson wrested into a form which corresponds to the supposed psychological fact. Thus may a teacher, fastening on the well established principle that a purpose should dominate a suitable element of school work, think that on all occasions the development of an adequate purpose must receive scrupulous and active attention. Consequently, class time is wasted in recasting certain historical material in the form of a problem when that material is already of direct and immediate interest to the class in the form in which it is presented in the text. Laborious efforts may be made to cast certain school work into the form of a cumbrous and semiartificial conduct unit when that work is already naturally arranged in the form of a conduct unit which appeals to the children directly. So one finds in teaching college classes in education that, while it may be necessary to recast the study of Froebel's theories into a kindergarten topic, it is entirely unnecessary to recast the study of methods of providing for individual differences of pupils, since this subject matter makes a direct appeal to teachers in training.

One needs, therefore, to beware of any fixed conception of the teaching process.¹

¹ From W. H. Kilpatrick, *Source Book in the Philosophy of Education* (1928), pp. 134-135. By permission of The Macmillan Co., publishers.

The right to equality of educational opportunity would, in a democratic society, be generally admitted. To say, however, that the right is absolute and should be enforced at every cost would commit us to a program that most will reject as soon as it is understood. For one thing, our children could no longer remain in their present homes, since homes are necessarily educative, and as educating agencies they are vastly unequal. Absolute equality of educational opportunity, being thus incompatible with separate homes, could be had, under present conditions, only at the cost of giving up, at least for several generations, the home as a place for children.

The important thing bearing on this discussion is that even so admirable and desirable a principle as equality of educational opportunity cannot be applied absolutely, but only in such a way as shall take due account of other principles and factors necessarily involved. The considerations here brought forward hold in general: Under any given set of conditions the optimum application of any principle—even of a principle in itself wholly admirable—may well not be the absolute (or maximum) application of that principle. In each particular case choice of conduct must be decided in the light of the total effect of all the factors involved. We cannot afford to be doctrinaire in the application of even the most important principles.

Stereotyped maxims concerning the awakening of interest, the necessity for class and individual planning, the initiating of all work by the pupils should be accepted with reservations. Great teachers have always realized this quality of relativity in their maxims. Herbart, for example, in spite of his doctrine of interest recognized the fact that forced attention and memorizing may be necessary. It is very wise to remember the old *doctrine of the mean* and to refuse to carry any maxim or method to undesirable extremes.

School work which is organized in terms of units of conduct is just as liable and possibly more liable to errors of the kind just referred to than simpler and

less variable methods. It sometimes happens that a teacher, filled with zeal for the *doctrine of self-activity* and in clear recollection of the teacher's function as a guide allows the child to undertake a task which is too hard. It is quite possible for a child to develop a strong interest in the making of some such object as a book-case, to make careful plans for its completion, and to fail in the making of the object through lack of skill in the handling of tools and materials. So one must be constantly on one's guard lest the knowledge of ideal procedures carry one into teaching situations which contain unknown and insuperable elements.

Skill in uniting responses to remote situations. The more active the teacher becomes in determining the course of the teaching process the more vital does it become. She may so become active not only by continually governing of her actions according to relative circumstances, but also by molding and shaping the work of the school to clear-cut and desirable ends. In a consideration of ways and means of so directing school activity, the science of psychology once more comes to the teacher's aid.

An understanding of the *law of associative shifting* as explained by Thorndike² has much to contribute in revealing to the teacher definite methods of control. This law may be stated in the following form:

In a complex situation to which an organism makes a complex response, if performance is continued or repeated, the elements of the situation may be gradually changed into other elements, and the elements of the response may be likewise gradually changed into other

²E. L. Thorndike, *Educational Psychology* (Teachers College, Columbia University, 1913), Vol. 2, p. 15.

elements, so that the desired combination of elements will produce the desired combination of responses.

This involved statement may be clarified by illustration. The following case is an example of a simple associative shifting in the situations which produce the response of the salivary reflex. In this illustration there is no shifting of response.³

A dog sees a box containing food and smells the food; the smell stimulus causes a response in his salivary gland—saliva accumulates in his mouth. If the same box be brought in daily, a conditioned salivary reflex will after a while be aroused by the mere sight of the box. If a bell be struck every time the box is brought in, after a while a conditioned salivary reflex will be brought about by the mere sound of the bell before the box is seen.

The elements of the varying situation which produces the response may be analyzed out as follows.

	<i>Situation</i>	<i>Response</i>
1st Series of Trials	sees box smells food	salivary reflex
2nd Series of Trials	sees box	salivary reflex
3rd Series of Trials	sees box hears bell	salivary reflex
4th Series of Trials	hears bell	salivary reflex

By substituting letters for the varying elements of situation and response according to the accompanying key, the associative shifting becomes the more evident.

³H. C. Warren, *Elements of Human Psychology* (Houghton Mifflin Co., 1922), p. 249.

KEY

<i>Situation or Response</i>	<i>Key Letter</i>
Sees box	<i>a</i>
Smells food	<i>b</i>
Hears bell	<i>c</i>
Salivary reflex	<i>x</i>

STEPS IN THE ASSOCIATIVE SHIFTING

<i>Situation</i>	<i>Response</i>
<i>ab</i>	<i>x</i>
<i>a</i>	<i>x</i>
<i>ac</i>	<i>x</i>
<i>c</i>	<i>x</i>

Such a shifting of elements which produce a response can be, as this case shows, so complete, that a situation which at the beginning of training had no effect on the organism will produce a definite response. Says Thorndike ⁴

Thus, what was at the start utterly without power to evoke a certain response may come to do so to perfection. Indeed, the situation may be one which at the start would have aroused an exactly opposite response. So a monkey can be taught to go to the top of his cage whenever you hold a piece of banana at the bottom of it.

The illustration just given does not, however, give a complete example of the working of the law under consideration. It neglects to indicate the way in which, as the law states, both situations and responses may be shifted in a series of changes theoretically, at least, without end or limitation. A further example in the same form may help to do so.

⁴Thorndike, *loc. cit.*

Suppose that an animal trainer wishes to teach a tiger to jump a hurdle at the crack of his whip. One may imagine that at the first the animal would be entirely unwilling to do anything so purposeless and under the circumstances unnatural. In other words the situation of a whip crack has no power over the animal. So well does the trainer know this that he does not even crack his whip. In the beginning, then, he is without either the desired stimulus or the desired response. He sets about to obtain the linking of these two remote and entirely absent elements. Instead of beginning with a whip crack he begins with a whip lash. This failing to accomplish his purpose he starves the animal for a day or so, places raw meat on the other side of the hurdle, and strikes the animal with the whip. Finally, the animal responds to the condition of dissatisfaction with this side of the hurdle and makes the desired leap to the satisfaction of raw meat on the other side. After practice through many days in this fashion the tiger learns to leap without his preliminary crouching and growling, then he leaps in the absence of the raw meat. The crack of the whip is substituted for the stinging stroke of the lash and the training has been completed. The series of changes in situation and response is set forth below in the same way as before.

	<i>Situation</i>	<i>Response</i>
1st Series of Trials	Disposition to inactivity A stroke of the whip A hurdle to be jumped	Crouching Growling
2nd Series of Trials	Disposition to inactivity A stroke of the whip A hurdle to be jumped Odor of raw meat when hungry	Crouching Growling Muscular responses of jumping

	<i>Situation</i>	<i>Response</i>
3rd Series of Trials	Disposition to inactivity	Growling
	A stroke of the whip	
	A hurdle to be jumped	Jumping
	Odor of raw meat when hungry	
4th Series of Trials	Disposition to inactivity	Jumping
	A stroke of the whip	
	A hurdle to be jumped	
5th Series of Trials	Disposition to inactivity	Jumping
	A crack of the whip	
	A hurdle to be jumped	

Substituting the letters of a key as before the following is obtained.

KEY

<i>Situation or Response</i>	<i>Key Letter</i>
<i>Situations</i>	
Disposition to inactivity	<i>a</i>
Stroke of the whip	<i>b</i>
A hurdle to be jumped	<i>c</i>
Odor of meat when hungry	<i>d</i>
A crack of the whip	<i>e</i>
<i>Responses</i>	
Crouching	<i>x</i>
Growling	<i>y</i>
Jumping	<i>z</i>

STEPS IN ASSOCIATIVE SHIFTING

<i>Situation</i>	<i>Response</i>
<i>abc</i>	<i>xy</i>
<i>abcd</i>	<i>xyz</i>
<i>abc</i>	<i>yz</i>
<i>abc</i>	<i>z</i>
<i>aec</i>	<i>z</i>

A consideration of these examples will enable one to realize that by the proper manipulation of the elements of situation and response, it is possible to train an organism to make the desired response in the presence of any given situation. The examples, which have been given, have been in the realm of animal behavior and have discussed responses of a gross motor type. The law of associative shifting, however, is equally valid for conduct on the higher levels of mental response, such as willing and thinking. Thus, it has been pointed out, that the teacher may so arrange things as to obtain any response of which a learner is capable to any situation to which he is sensitive.

The significance of this truth to the teacher is wide. For practical purposes it means that, within reasonable limits, by direct efforts at training, it is possible to induce pupils to act in any way which she considers desirable. Thus, the teacher who takes over an unruly room may take advantage of the law of associative shifting and remake the responses of the children so that they will act in an orderly and social way. The actual working of the law in a concrete situation may be seen in the case of a certain Sunday-School class composed of twelve-year-old boys who were but little interested in the Sunday morning lesson. The teacher on taking over this class did not attempt to alter the situation immediately but accepted all the responses which the pupils made without demur. The class was merely asked what it wanted to do during the lesson period. The first suggestion was "play football." The teacher answered that such an activity was undoubtedly good in its place, but that the class would obviously be stopped by the Sunday-School authorities and, consequently, it was impracticable. It was explained that something would have

to be taken up which could be done within the limits of the classroom. The immediate request, which at once became unanimous, was that the teacher should read a story. On being asked what story the boys requested the story in the current issue of the Sunday-School paper. This story was read to their delight and satisfaction and the lesson period was concluded. It did not, however, conclude without the issuance of pressing invitations to the teacher to return on the following Sunday.

On the following Sunday the work went on much as before except for the fact that the teacher suggested that a story which he had found of interest be substituted for the story in the Sunday-School paper. A story by Joel Chandler Harris was read and was not found wanting. In fact, others were requested in quick succession. It was an easy step from this to the account of Jael's slaughter of Sisera from the book of Judges. As time went on, through successive weeks, the boys were led to organize their new found freedom by the election of officers and these officers were trained to use their influence in stimulating respect for the group activities. Soon the officers and class members found that they were given an opportunity to present their ideas on the lesson, for by this time the story reading and the football had been so crowded out by Bible study that it was necessary to institute a week-day meeting to look after them. The week-day meeting soon grew in attendance and its activities were enlarged and supplemented. But even this proved to be an insufficient program. It was scarcely six months before the class was turning out for a special Sunday session at nine-thirty in the morning, half an hour before the opening exercises of the remainder of the Sunday School.

Such changes can be brought about by the simple

application of the *law of associative shifting*. One element may be introduced to bring in another and then the undesirables may gradually be eliminated. Thus what is topsy-turvy may gradually be righted.

One further example which the writer heard related by Kilpatrick of the way in which he trained a class of school children to continue their work uninterrupted during the absence of the teacher from the room. The class under the regime of former teachers had been accustomed to create a disturbance as soon as the teacher left the room. The new teacher, however, discussed the matter with them until they seemed to see that it was not the right thing to do. He then informed them that he would leave the room for one minute, and that he wished them to continue their work just as though he were present. As he waited outside, at the other end of the hall, he could hear that the customary hubbub was soon in full force. With equal fidelity to tradition it died away as his returning footsteps were heard in the corridor.

On entering the room he asked all the students who had acted otherwise than as they should have acted to stand. One straggler arose. In all probability the teacher indicated his surprise at finding out that so *much* noise could have been created by a single disturber. Nothing further, however, was said and on the morrow the experiment was repeated. This time a handful of culprits confessed and were as before unrepri-manded. As the days went by the room became quieter although the period of absence lengthened, the number of guilty ones to confess became at first larger and then smaller, and more shamefaced, until it disappeared together with the old-time commotion. The class at last had developed a spirit of orderliness in the absence of

the teacher which had been brought about by the use of the *law of associative shifting* in training directed definitely to this valuable end.

Direct social training as a basis for order. Such direct training as that indicated in the example just related is of particular value when it is used to build up a proper basis of order in the schoolroom. It is fundamental to any understanding of the problem of order to realize that all real order is internal order. Order should not be maintained, but built. The teacher who hopes to stand before her class with a rod to compel obedience will find the task very like carrying a large and leaky parcel, something is sure to burst forth somewhere. The true solution of the problem of order lies in the creation in the minds of children of the will to behave.

The children's alliance. It frequently happens that children form an alliance among themselves which is none the less potent because it is tacit. Grown-ups who are out of touch with children are not likely to realize how very definite and real a barrier this alliance may be, and how clearly it sets a mark between children and adults. Children sometimes have a world of their own in which others of their own age share freely but which is a foreign and hidden land to the grown-ups who know them best. There is a code of honor among children which rigidly excludes the adult who is unable or unwilling to take the child's point of view.

Whenever any group of children senses or discovers any individual adult to be an enemy of the group or when the children sense the formation of any adult alliance secret from or antagonistic to them, the bands of the children's alliance tighten. It is scarcely necessary to mention the way in which a group of young people may unite to prevent some teacher from dis-

covering a misdemeanor of one of the group. The law of the children's alliance is expediency. It is a protective response against complete domination by an outside force.

The teacher who would, for the sake of order and control, cut the bonds of the children's alliance would do well to assume an attitude of sympathetic humility. Such a teacher must first take the point of view of the children, must bear their words and deeds, and must allow them to build up their own personalities without being cramped or crushed. When once a teacher has been admitted to the alliance, she becomes a prized and honored member of the group, the trusted champion of their interests. The teacher who succeeds in attaining such a standing will be rewarded by infinite opportunities to influence and control conduct of individuals and of the class.

Social order. The true basis of social order is just a determination to obey the law in the persons who compose the community. So the development of a condition of internal orderliness is well illustrated in the socialized recitation. The following quotation⁵ serves well to indicate the way in which, in accordance with the law of associative shifting, direct training in the observance of the laws of the group may result in the development of true order in the school.

The instructor believed that no one has a right to restrict the activities of children unnecessarily or arbitrarily, and that the English teacher herself received the best part of the training in the usual recitation work. Therefore the restrictions of the school were gradually removed. One privilege at a time

⁵ E. R. Golden, *Character Education Methods*, Character Education Institution, Chevy Chase, Washington, D. C., p. 9.

was conceded, or right granted, but nothing was said about the ultimate intention of putting the responsibility on the pupils. It was perhaps three months before they were fully in charge. First they were allowed to sit where they wished each day, then to move about or talk provided they were courteous and did not interfere with the accomplishment of the work. Later the idea of organization was broached, and received by the pupils enthusiastically. The officers were a chairman, secretary, substitute, and two critics. The instructor became a director and her duties were defined by the constitution. This important document, framed by a committee in conference with the director, gave to the members of the group all the freedom that would be given by the ideas of courtesy and consideration for the work to be done. The chairman appointed a program committee who met with the director and divided the lesson assignments into topics or sections which were presented by the pupils standing before the class. These programs were duplicated and distributed in advance, three or four programs on a sheet. A desk was placed in the front of the room at which the chairman and the secretary sat. At the stroke of the last bell the meeting was called to order without reference to the presence of the director. The minutes of the previous meeting were read and necessary business transacted before the program period. In the report of their critics much emphasis was placed upon constructive criticism rather than mere faultfinding. After this the director was asked to take charge and this gave her an opportunity to round up the work.

The chairman was expected to control the sessions in proper form and the critics were severe in their condemnation of any inefficiency, or lapse from courtesy, or interference with the work period. Officers were elected every two weeks by ballot which gave all a chance for practice in parliamentary procedure.

They exacted of their speakers correct position and a presentation of the topic which was complete and as interesting as possible. If the pupil was assigned a section in a composition text he was expected to invent a new way to call out from the class the important points. They would require a real recitation from the one called on, a most excellent training in

methods of study. The class responded as carefully and courteously to the questions of their mates as to those of the director. Speeches, debates, impromptu dialogues, and discussions of the current events were part of the daily work. Dramatization was used whenever it was possible in the literature, one group reading the parts while another directed their movements. In case of any uncertainty as to procedure they appealed to the director who would discuss the point with them and let them work it out for themselves if possible.

Standards for rating their work were placed on the bulletin board. At the end of the six weeks period they handed in their estimates. If this did not agree with that of the director a conference was held and an agreement was reached before the grade was sent to the office. They were very successful in self-measurement except in the oral English when their natural embarrassment sometimes made them underrate their efforts.

Pupils said they looked forward all day to that period and the teacher enjoyed it as much as they. The attendance was very regular, and the amount and quality of work done was a revelation to pupils, teachers, and parents. The pure joy of living and working together carried both teacher and pupils on with the minimum of effort to the maximum of results.

The same form of organization was later organized in other classes and other teachers with great success. The feature that was most gratifying was the marked improvement in the poorest pupils, those on which prodding had no effect. They were soon happily at work and eager to do their share in the work of the group.

Another example is to be found in an account given by Hatch⁶ of the way in which the will of the group was enlisted in the cause of class order. During a discussion of home rule by this junior high-school class the situation became rather heated.

⁶R. W. Hatch, "Teaching Modern History by the Project Method," *Teachers College Record*, Teachers College, Columbia University, Vol. 21, Nov. 1920, p. 455.

Feeling ran high with some of the pupils and comments were made on both sides of the question in no uncertain tones—a real social situation. After one of these outbursts the instructor at the next meeting of the class took the occasion to read Franklin's plea for harmony at the Constitutional Convention. He made no comment or "preachment." But there was no question of its direct application. "Light, not heat" was placed upon our "Watch this spot!" board. The class rallied to the ideal; the social disapproval of the group was manifest whenever any one broke out after that, and when we came to the end of the project they wished to carry it further with a good debate. A class discussion was held with the president in the chair to ascertain whether or not this could be done on the "Light, not heat" basis, and the "light" won. So speakers were chosen by the debating committee to defend the three aspects of the situation, present status, home rule, and independence.

One of the most eminent educators in the United States relates the story of the way in which as a young man he was called back to a position which he had resigned to another to put in order the school which he had recently left. In telling the story he pointed out how mistaken was his pride in supposing that such a recall was complimentary. While it certainly indicated his ability to manage a school, it revealed at the same time that the order that had been maintained was not of the self-supporting or internal kind.

Adaptation of resources to desired ends. The continual and constant change which pervades the teaching process is the better realized when teaching is thought of as the process of adapting means to ends. Any formal or routinized method of teaching is as a dead thing beside the active and virile method which regards each new schoolroom situation as an entirely new problem to be solved by the very best adaptation of the resources at one's disposal to the obtaining of the results desired.

By the resources of the teaching process are meant not such mere accidentals as the blackboard and the chalk, but also the infinite treasure of childish interests and instincts, the momentary mood, the passing desire, or the fortunate advent of some wintry caterpillar.

The teacher who organizes her work in a preconceived and rigid plan may be compared to the boarding-house mistress who always serves stew on Wednesday, codfish on Friday, and baked beans on Saturday. The original and lively teacher may be compared to the mistress of the home table who consults the likes and appetites of her family.

Teaching upon this adaptable and variable plan is difficult because it involves both adequate knowledge of the elements of the educative process and intelligence in their application. It is a comparatively simple process to follow the syllabus of the department of education and to teach according to predigested plans issued by some state authority. It is a different and much more difficult thing to master the principles of good teaching, to learn to analyze and understand the child, the curriculum and their true relations one to the other. But by as much as it is the more difficult, it is the more successful method. By as much as it is the rarer virtue, it is the more valuable one.

How shall that teacher succeed who knows how to follow the instructions she has received but who cannot safely or intelligently vary from them. What is the dilemma of the young schoolmistress who finds herself in a rural school in a poor district, which tolerates rather than supports its school. There she finds none of the attractive red and green construction paper which she learned to use in her training college. There is no equipment for manual work of any kind—no scissors, no

paint, no paste, no brushes. The field is barren, it lacks the essential elements of efficient teaching.

So says the tyro but not the old experienced teacher. Her view of the situation is somewhat different. She says that the real essentials of good manual construction are present in all their fullness. She finds them in the interests and the needs of the children. Here are the real and vital resources of the school. These country children in their barren environment are more in need of her best ministrations than children in many a better equipped school. What is missing is merely a few pieces of paper and a few lengths of string.

But are even these things missing? Has the teacher missed nothing in making an inventory of her resources? The children being induced to hunt in every hole and corner bring from home splendid supplies of paper. Endless string is brought to school and dyed an attractive red which might grace any Christmas card. Colored magazine advertisements are saved, an ample supply of paste is soon made for a few cents and flavored with alum to prevent its improper consumption. Finally, a few pairs of scissors are bought at about ten cents each. It is not long before the schoolroom is the brighter for many a colored poster and the richer in decorative cut-outs and doll's furniture. So much can one do who has a well defined purpose and can use the material at hand to the best advantage.

The good teacher is not tied down to rules and precepts. It is undoubtedly true that children should be expected to obey and even that they should bear the consequences of their own disobedience. In spite of these things who could approve of the efforts of a certain teacher to live up to these rules of school management? On the day preceding a total eclipse of the sun the

children were told that if they wished to watch the eclipse they must bring to school on the following day a piece of smoked glass through which to regard it. When the hour of the eclipse arrived two children only were properly equipped according to directions. They were permitted to watch the great spectacle according to the promise. The other forty children were compelled to remain in their seats working arithmetic problems while one of the most spectacular wonders of the heavens was being enacted beyond the walls, a phenomenon of such rarity that it would not occur again within their lifetime. So may the teacher be just rather than wise. We must beware of bad teaching in the semblance of good pedagogy.

PROBLEMS FOR CLASS DISCUSSION

1. Teachers are often told, "I should think you would find teaching monotonous." What reply would you make?
2. Discuss the importance of the matter of relative values in teaching.
3. Give an example of the use of the *law of associative shifting* by a teacher.
4. Distinguish between the *conditioned reflex* and learning based on the *law of associative shifting*.
5. Which in your opinion is the better plan for a beginning teacher, to enforce order at the beginning and continue to enforce order, to enforce order in the beginning and by the *law of associative shifting* train the pupils to become orderly on their own responsibility, or to allow disorder in the beginning and train the pupils to assume responsibility for order?

OUT-OF-CLASS ACTIVITIES

1. Watch among children for evidences of the children's alliance. Among adults for evidences of an adult alliance.
2. Talk to some teacher who has the confidence of children as to how she wins that confidence.

CHAPTER X

THE MEASUREMENT OF THE RESULTS OF TEACHING

"There is no object, process, event or relation in man's nature which does not exist in some definable amount."¹ Such is the specious philosophy which forms the foundation of the modern science of educational measurement. It is not necessary here to go into the history of this movement to measure various aspects of the learning and teaching process, since this history is adequately treated elsewhere.² Suffice it to say that the development of educational measurement is, generally speaking, a growth of the first quarter of this century and is but another branch of the scientific movement in education.

From time immemorial teachers have carried on educational measurement. Whenever in the past teachers have said to their charges: "You have not worked so hard this month as you did last," when they have graded compositions and scored examinations they have made educational measurements. The newness of the matter is merely one of manner and method. It is an attempt to improve and refine educational "measuring

¹E. L. Thorndike, *Educational Psychology* (Teachers College, Columbia University, 1913), Vol. 2, p. 73.

²L. P. Ayres, "History and Present Status of Educational Measurements," *Sixteenth Yearbook of the National Society for the Study of Education*, Part II. See also James B. Sears, "Development of Tests and Measurements"; Ch. v of L. L. Kazell, *Twenty-Five Years of American Education* (Macmillan Co., 1924).

rods," to clarify and objectify units and instruments of measurement. It is an attempt to do the work of measuring more accurately and efficiently.

This attempt to improve educational measurement has received its stimulus from a certain dissatisfaction which has recently arisen with customary methods of estimating and evaluating the learning of individuals. Investigations have shown that such judgments have often been extremely subjective and comparatively unreliable. This fact is illustrated by an experiment in which thirty-three fourth-grade arithmetic teachers, who had been marking such papers during the year, were asked to score in terms of 100 per cent the same examination paper, an arithmetic paper answered by a fourth-grade child. It was found that one teacher gave the paper a score as low as 32 per cent, each of the scores 41, 43, 44, 46, and 47 per cent was given by some one teacher to the same paper, two teachers scored it 50 per cent and the various scores 51, 54, 55, 57, 59, 66, 69, 70, 72, 74, 75, 78, and 82 per cent were all given by either one or two teachers except for the score 70 per cent which was given by five teachers. Similar results have been discovered by other investigators³ with the obvious corollary that such arbitrary judgments vary tremendously, that the tradition of infallible teacher judgments is untenable.

TYPES OF EDUCATIONAL MEASUREMENT

As a result of the labors and research of numerous teachers and scientists, there have been devised and constructed during the past two decades a series of

³ Monroe, De Voss, and Kelly, *Educational Tests and Measurements* (Boston, Houghton Mifflin Co., 1924), p. 1.

instruments of improved accuracy for the measuring of educational products. These tests are at the present time so numerous and are directed toward the measurement of so many varying aspects of learning that it would be impossible here to discuss or even list them. Teachers who wish any such extended descriptive list should secure an up-to-date bibliography of educational tests.⁴ For the present purpose it will be sufficient to indicate the various types of tests which are available and useful to teachers, and to give some brief indication of how they may be used in the classroom.

Tests may be classified into three general types according to their nature and the purposes for which they are used. These types may be referred to as: (1) tests of mental efficiency, (2) standardized tests of educational achievement, and (3) objective, new-type classroom tests. Each of these will now be taken up in order, illustrated, and commented upon briefly.

1. Tests of mental efficiency. These tests are more commonly referred to as "intelligence tests." They are not to be confused with achievement tests, which are intended to measure educational progress or achievement in subject matter. Just what mental tests do measure it is hard to say with certainty. They have been regarded by some as instruments for the measurement of the fixed factor of mental life which has been referred to earlier in this book as "inherited mental capacity." The deterministic school, which tended to take this point of view, has been so vehemently attacked in recent years, however, that few to-day hold deterministic views. Psychologists now tend to say that "intelligence tests" seem to measure in terms of his past learning, the individual's

⁴"Bibliography of Educational Measurements," Bureau of Education, Indiana University, Second Revision, 1928.

capacity to learn. Extensive investigations seem to have established the faith that the transmuted score of a child on a reliable "intelligence test" is in the majority of cases a fairly dependable forecast of his mental efficiency. Certainly such scores seem, in most cases, to be more reliable for prognosis than the judgment of teachers, and have, as an added advantage, the possibility of being earlier determined.

There are numerous tests designed to measure mental efficiency. They have various merits and various advantages. Some are designed for group administration, others are to be administered individually. A brief description will here be given of a section of the Stanford Revision of the Binet-Simon Scale, which has never been superseded as a mental test for individual administration.

STANFORD REVISION OF THE BINET-SIMON INTELLIGENCE SCALE

Tests for Seventh Year

The individual child is requested by an examiner to perform six tasks. His responses are observed, recorded, and scored objectively.

TASK 1:

The child is asked by the examiner: "How many fingers have you on one hand?" "How many on the other hand?" "How many on both hands together?"

The test is passed if all three questions are answered correctly and promptly

TASK 2:

Standard pictures of a Dutch home, a river scene and a post office are shown. The examiner asks: "What is this a picture of?"

The test is passed if two of the three pictures are described and interpreted.

TASK 3:

The child is asked to repeat five digits when the numbers are read to him as 1-7-3-2-9.

TASK 4, 5, and 6.

These tasks are respectively the tying of a bowknot, the giving of differences between two things, such as a *fly* and a *butterfly*, and the copying of a diagram of a diamond which is exhibited.

To a reader who is unfamiliar with the whole process the above description will assuredly awaken more questionings, doubts, and interests than can be briefly answered. It can only be suggested that an understanding of such a complex scientific instrument as this scale can only be reached after considerable careful study. Teachers who are interested in this matter will do well to secure Dr. Terman's book in which the scale is completely and intimately described and discussed.⁵

This test is best given by a trained psychologist. When it has been administered the scores are computed and finally transmuted into a score known, in the case of this particular test, as the *intelligence quotient* or I.Q. It is theoretically held that a normal individual will secure scores which indicate an I.Q. of 100, a dull individual will score less than 100 and a bright pupil more than 100, and that the intermediate scores indicate degrees of brightness.

The ordinary classroom teacher cannot be expected to administer intelligence tests. She may, however, be concerned with interpreting the behavior of children in the light of intelligence quotients furnished her by the school psychologist. It is desirable that in doing so,

⁵L. M. Terman, *The Measurement of Intelligence* (Houghton Mifflin Co., 1916).

teachers should rid themselves of a common tendency to regard the process of intelligence testing as something mystical. It is in no sense mystical. The I.Q. is merely the mathematical resultant of the scores made by a child in carrying out a series of tasks. It is fallible, but probably less fallible than any other single judgment available. It should also be remembered that when inaccuracy occurs in an intelligence quotient or when the judgment it gives is in error, the weight of that error is not distributed over a group but bears in its fullness on a single individual.

Consequently, the greatest care should be exercised in the interpretation of the meaning of behavior of individuals in relation to their intelligence scores. There seems to be an increasing tendency to attach less weight to these scores in interpreting the nature of individuals. Intelligence scores are no longer considered an adequate basis for the estimating of the efficiency of pupils, but are assuming a position in which they are regarded as but one of a series of personality traits which combine to picture the individual.

2. *Standardized tests of educational achievement.* Standardized tests may be classified into three groups namely (1) achievement tests, (2) diagnostic tests, and (3) practice tests. Examples of several types of achievement tests and of a diagnostic test are here presented. Practice tests are extended in nature so that no example will be given here.

a. Achievement tests. Achievement tests are tests which have been carefully prepared to test the progress of children in the mastery of subject matter. The nature of these tests may be gathered from the following.⁶

⁶ Clifford Woody, *Multiplication Scale, Series B* (Teachers College, Columbia University).

SERIES B

MULTIPLICATION SCALE

By Clifford Woody

School Date
 Name
 How old will you be?
 In what grade are you?
 City County
 When is your next birthday?
 Are you a boy or a girl?
 Teacher's name

(1)	(3)	(4)	(5)
$3 \times 7 =$	$2 \times 3 =$	$4 \times 8 =$	$\begin{array}{r} 23 \\ 3 \\ \hline \end{array}$

(8)	(9)	(11)	(12)
$\begin{array}{r} 50 \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 254 \\ 6 \\ \hline \end{array}$	$\begin{array}{r} 1036 \\ 8 \\ \hline \end{array}$	$\begin{array}{r} 5096 \\ 6 \\ \hline \end{array}$

(13)	(16)	(18)	(20)
$\begin{array}{r} 8754 \\ 8 \\ \hline \end{array}$	$\begin{array}{r} 7898 \\ 9 \\ \hline \end{array}$	$\begin{array}{r} 24 \\ 234 \\ \hline \end{array}$	$\begin{array}{r} 287 \\ .05 \\ \hline \end{array}$

(24)	(26)	(27)	(29)
$\begin{array}{r} 16 \\ 2\frac{5}{8} \\ \hline \end{array}$	$\begin{array}{r} 9742 \\ 59 \\ \hline \end{array}$	$\begin{array}{r} 6.25 \\ 3.2 \\ \hline \end{array}$	$\frac{1}{8} \times 2 =$

This is part of but one of many tests which have been devised to measure progress in addition, subtraction, multiplication, and other processes of arithmetic. For most of these tests, standards have been obtained which indicate scores that children of various grades in schools

have obtained on the test in question. This makes it possible for the teacher to compare the accomplishment of individuals and of her class in the factor measured with that of other classes of the same grade.

	A	B	C	D	E	F	
SECOND GRADE →	99	98	96	94	92	88	84
		THIRD GRADE →	100	99	98	96	94
					FOURTH GRADE →	100	
He Sis	and cat is	a it is she can see run	the in so now man ten bed top	he you will we an my up last not us am good little ago old bad red	all your time may into	over in'	

SECTION OF AYRES SPELLING SCALE⁷

All the words in each column are of approximately equal spelling difficulty. The steps in spelling difficulty from each column to the next are approximately equal steps. The numbers at the top indicate about what per cent of correct spellings may be expected among the children of the different grades. For example, if 20 words from column H are given as a spelling test it may be expected that the average score for an entire second grade spelling them will be about 79 per cent.

¹ Russell Sage Foundation, New York City, Division of Education.

For a third grade it should be about 92 per cent, for a fourth grade about 98 per cent, and for a fifth grade about 100 per cent.

The limits of the groups are as follows: 50 means from 46 through 54 per cent; 58 means from 55 through 62 per cent; 66 means from 63 through 69 per cent; 73 means from 70 through 76 per cent; 79 means from 77 through 81 per cent; 84 means from 82 through 86 per cent; 88 means from 87 through 90 per cent; 92 means from 91 through 93 per cent; 94 means 94 and 95 per cent; 96 means 96 and 97 per cent; while 98, 99 and 100 per cent are separate groups.

By means of these groupings a child's spelling ability may be located in terms of grades. Thus if a child were given a 20 word spelling test from the words of column O and spelled 15 words, or 75 per cent of them, correctly it would be proper to say that he showed fourth grade spelling ability. If he spelled correctly 17 words, or 85 per cent, he would show fifth grade ability, and so on.

This scale, given here in part, is extended with long lists of words for the intermediate grades right up to the eighth grade. It differs from the last test in that each pupil does not receive a copy. The teacher holds a copy of the scale and prepares individual tests from the scale according to her purposes.

SCALE FOR MEASURING WRITTEN COMPOSITION *

The values 20, 30, 40, 50, 60, 70, 80 and 90 given the respective samples are arbitrary and merely for practical convenience. 20 means 15 to 24, 30 means 25 to 34, etc.

DIRECTIONS FOR USING THE WILLING SCALE FOR MEASURING WRITTEN COMPOSITION

In using this composition scale, these directions should be followed carefully because the compositions of the scale were written by school children who followed these same directions.

*Devised by M. H. Willing, Published by Bureau of Educational Research, University of Illinois, Urbana, Illinois.

Securing Compositions. 1. The teacher should make certain that all pupils are provided with good pen points and ink, or well-sharpened pencils, if pencils are to be used. Have distributed to each pupil two sheets of theme paper (approximately 8½x11). It is best to use theme paper which has printed at the top the suggested list of topics. If this kind of paper is not used, the teacher must write the following list of topics on the blackboard:

An exciting experience

A storm

An accident

An errand at night

A wonderful story

An unexpected meeting

In the woods

In the mountains

On the ice

On the water

A runaway

The compositions which are secured from the students are compared with the standard compositions given on the scale and scored according to directions printed on the form. Four samples of the standard compositions, of which there are eight, are here given.

20

Deron the summer I got kicked and sprain my arm. And I was in bed of weeks And it happing up to Washtion Park I was going to catch some fish. And I was so happy when I got the banged of I will nevery try that stunt againg.

Number of mistakes in spelling, punctuation, and syntax per hundred words, 30.

30

The other day when I was rideing on our horse the engion was comeing and he got frightened so he through me down and I broke my hand.

And the next thing I done was I went to the doctor and he put some bandage on it and he told me to come the next day,

so I came the next day and he took the bandage off and he look at it and then it was better.

Number of mistakes in spelling, punctuation, and syntax per hundred words, 23. .

50

One time mother and father were going to take sister and I for a long ride thanksgiving. We had to go 60 miles to get there, When sister and I herd about it we were very glad. It was a very cold trip. We four all went in a one seated automobile. Dady drove and mother held me and sister sat on the top the top was down. Mother could not hold sister for she was two heavy. When we got there they had a hot fire ready for us and a goose dinner. We were there over night. In the morning it was hot out. This was on a farm. Sister and I got to go horse-back riding. It was lots of funs. They had children. The children were very nice. Our trip home was very cold. When we got home it had snod.

Number of mistakes in spelling, punctuation, and syntax per hundred words, 14.

90

The most exciting experience of my life happened when I was five years of age. I was riding my tricycle on the top of our high terrace. Beside the curbing below, stood a vegetable wagon and a horse. Suddenly I got too near the top of the terrace. The front wheel of my tricycle slipped over and down I went, lickety-split, under the horse standing by the curbing. I had quite a high tricycle and the handlebars scraped the horse's stomach, making him kick and plung in a very alarming manner. I was directly under him during this, but finally rolled over out of his way and scrambled up. I looked at my hands! Most of the first finger and part of the thumb of my left hand were missing. The horse had stepped on them. I had endured no sensation of pain before this, but now my mangled hand began to hurt terribly. I was hurried to the hospital and

operated on, and now you would hardly notice one of my fingers is missing. I certainly have good cause to congratulate myself on my good fortune in escaping with as little injury to myself as I did, for I might have been terribly mangled in my head or body.

Number of mistakes in spelling, punctuation, and syntax per hundred words, 0.

After scoring the pupils' compositions the teacher may arrange the class scores in the form of a distribution and compare the accomplishment of her class with standard accomplishment according to the accompanying data.

Tentative Standards. Tentative standards for Willing's Composition Scale are given below. It will be noticed that the median scores for Denver are conspicuously below those for five Kansas cities. This may be due to the fact that reports have been received from only a few cities.

MEDIAN SCORES FOR WILLING'S COMPOSITION SCALE

Grade	Denver		Five Kansas Cities	
	Story Value	Form Value	Story Value	Form Value
IV	32	22	44	12
V	43	16	58	10
VI	50	14	75	5
VII	60	11	77	5
VIII	63	10	82	6

It is not possible here to go into the technique of the administration and scoring of standardized tests. Teachers who are interested in doing this type of work will find it necessary to give the subject special study.⁹

⁹ Monroe, De Voss, and Kelly, *Educational Tests and Measurements* (Houghton Mifflin Co., 1924). See also H. O. Rugg, *Statistical Methods Applied to Education* (Houghton Mifflin Co., 1917).

Teachers who are trained in this very technical matter of educational tests will find many uses for such tests in their classrooms. On the other hand, such tests have other uses than those to which they are put by the classroom teacher. They are widely used in school surveys and by school administrators to classify pupils in the grades. Such uses will be briefly mentioned later.

b. Diagnostic tests. Diagnostic tests are used in the classroom by teachers to diagnose the accomplishment and difficulties of individual children in some field of special subject matter. The following is an example of a diagnostic test in "grammar."¹⁰

..... Class or Section

On each of the lines below are four sentences such as:

It isn't true. We was home. How are you? All are here.

Of these four sentences—"We was home"—is grammatically incorrect; this wrong sentence has been underlined.

On each of the lines below there are four such sentences. One, and only one is grammatically incorrect. You are to find, this wrong sentence, and draw a line under it. Work as rapidly as you can. And remember, underline the incorrect sentence. If you are not certain which sentence is incorrect, guess. Be sure to finish before time is called.

1. I wrote to him and her. He spoke to her and me. She stands better than I. Between you and I, it's not so.
2. To whom should it go, you or me? Who did they say was hurt? Who will the book be read by? I know whom he struck.
3. She is far ahead of me. He likes me but not them. I am older than him. You work as well as she.
4. That seems to be he. You and they must decided. We girls are all going. Does that apply to we older boys?
5. Every girl took her seat. If one practices, they can learn.

¹⁰ Diagnostic Grammar Test, Indiana University, Department of Psychology.

It is a book with riddles in it. Has anyone lost his knife?

6. Everyone has his book. All the boys have their books. Each man has his gun. Nobody missed their train.

7. Each girl had her hat. Everybody wants his book. The class will reach their early record. All of us want our hats.

8. Neither Joe nor he has their lesson. Every girl has her eyes on him. Have the boys their pens? Their hats are ready for them.

37. He asked her if she was going. The sun shines and it is hot. When he heard her he spoke. He is neither sick or tired.

38. She asked him because she needed him. The reason was because he was late. He came since he was in town. He refused as he could not go.

39. He looks like he was cold. He speaks as I would. He ran like mad for the house. He looks like me.

40. He was torn between two plans. He sent around word among the people. We will divide it between us three. There was famine throughout the land.

If you finish before time is called go back over your work and be certain you are right. Many mistakes are due to carelessness.

By analysis of the results of an individual pupil on such a test a diagnosis of his case in the matter of correct usage may be made, and the results may become the basis of instruction and training in the direction of the child's individual needs.

c. Practice tests. Practice tests in arithmetic, for instance, are so designed that children may work day by day on a series of practice lessons and by means of the tests which they administer themselves, discover whether or no the mastery of the lesson is sufficient to warrant their going on to the next lesson. Each pupil continues

practice on a lesson until he successfully passes the test which covers that material. He thus proceeds at his own rate through the subject matter, testing his progress as he moves forward. Such tests are very useful in setting up mediate goals in the acquirement of complex skills, such as the ability to figure and spell.

3. *New-type classroom tests.* Tests of mental efficiency and tests of educational achievement require the purchase of measurement material and technical skill in administration and interpretation. There is still another type of test which may be prepared by any teacher who will take the trouble to understand the simple technique involved. Various schemes have been worked out for the giving of tests which are comprehensive, objective, and comparatively easy to score. Several of these types of tests will now be described: (1) the true-false tests, (2) the completion test, and (3) the single- and multiple-response test.

a. True-false test. The true-false test is prepared in the form of a long series of true or false statements regarding the subject matter in which the pupils are to be examined. These statements are then turned into question form and given on mimeographed sheets to the students in some such form as follows. If they are arranged so, they may be scored readily by means of a key-form placed by the side of the pupils' answers.

In the following examples the questions are chosen from various fields of subject matter by way of example. In any test which a teacher might prepare the questions would probably all be chosen from one field of subject matter, such as geography.

Directions. The following questions are to be answered by *yes* or *no*. *Do not guess.* If you are not able to decide whether

a statement is true or false, leave it alone. You will lose a point from the total mark if the answer is given incorrectly. Write your answers to the left in the spaces indicated by the dotted lines.

Geography

- 1. Is Detroit, Michigan, one of the most important automobile manufacturing centers in the United States?
- 2. Is the temperature at the North Pole always below zero?

(This should be followed by at least 50 or 60 similar questions in Geography, based on the work on which the class is to be examined.)

Language

- a. Is the use of *lay* in the following sentence correct? He lay down and went to sleep.

Civics

- a. Must all appropriation bills in Congress originate in the house of representatives?

Nature Study

- a. Do cuckoos lay their eggs in the nests of other birds?

English

- a. Was *Pickwick Papers* a journalistic failure when it was first published serially?

When the test is given in this question form care should be taken to first formulate the parts as statements before turning them into questions. This will avoid the type of question which gives an indication as to the nature of the answer. There should be a large number of questions in this type of test and the questions should be clearly stated and not involved. It is a good

plan to make up more questions than are needed and to discard the poorest of them.

b. Completion tests. Completion tests are composed of statements from which certain important words have been omitted. They may be prepared from almost any type of subject matter. It is sometimes advisable to include in the forms an indication of the number of letters in the correct answer.

Physics

1. Boyle's Law states that when a is subjected to compression and kept at a constant temperature the (6) is (9) proportional to the pressure.

English

1. *Allegro* and (11) were written by (6).

Music

1. Half tones in the scale occur at the and intervals.

(Not merely sentences but whole paragraphs may be given in this form, with the omission of important words.)

c. Recognition tests. Recognition tests are of several kinds. In each case the student is required to select the correct answer from a number of answers which are probable but some of which are correct and some incorrect. These recognition tests may present single choice, plural choice, or may be in the form of matching elements which go together.

SINGLE CHOICE

English

1. "Old, unhappy, far-off things, and battles long ago" is a quotation from: (1) Wordsworth, (2) Coleridge, (3) Tennyson, (4) Noyes.

Astronomy

1. The distance of fixed stars from the earth is measured in (1) miles, (2) microns, (3) light years, (4) meters.

Biology

1. Man is (1) quadruped, (2) invertebrate, (3) protozoan, (4) mammal.

PLURAL CHOICE

English

1. Underline two of the following who are recognized contemporary poets of standing: (1) Galsworthy, (2) Millay, (3) Shaw, (4) Amy Lowell, (5) Ethel Barrymore, (6) Drinkwater.

Geography

1. Underline each of the following cities which is the capital of a state: (1) Topeka, Kansas; (2) Albany, New York; (3) Cleveland, Ohio; (4) Austin, Texas; (5) San Francisco, Cal.; (6) Minneapolis, Minn.; (7) Frankfort, Ky.; (8) New Orleans, La.; (9) Providence, R. I.

MATCHING

Place before each event the number before the name of the President whom you associate with it.

Presidents

Chief Events

- | | |
|------------------------|---------------------------------|
| 1. Thomas Jefferson | — Rise of spoils system |
| 2. James Madison | — Dred Scott Decision |
| 3. Andrew Jackson | — Fourteenth Amendment |
| 4. James K. Polk | — Building Panama Canal |
| 5. James Buchanan | — The Civil War |
| 6. Abraham Lincoln | — Panic of 1893 |
| 7. Andrew Johnson | — Louisiana Purchase |
| 8. U. S. Grant | — Resumption of Specie Payments |
| 9. R. B. Hayes | — The war with Spain |
| 10. Grover Cleveland | — The Credit Mobilier |
| 11. William McKinley | — The Mexican War |
| 12. Theodore Roosevelt | — The war of 1812 |

Such new-type tests may be made by any teacher to meet her needs. They should be carefully protected, and not allowed to circulate. All forms should be returned to the teacher at the end of the examination. Thus, if circumstances warrant, tests, or parts of them, may be used again after a number of years. Teachers will find that, after some experience in use of such tests, they will be able to devise other similar types of objective tests which are more or less original.

The relation of measurement to teaching. The teacher cannot avoid concerning herself with measurement. Nevertheless, she should never lose sight of the fundamental fact that measurement is not teaching; measurement is not an essential of learning. Rather might measurement be regarded as an unavoidable accompaniment of schools as they are organized to-day. The richness of the recent development in the field of measurement technique has resulted in the placing of considerable emphasis upon this aspect of school life. For that reason it is all the more necessary, while appreciating the importance and value of such development, to be clear on the subsidiary nature of the measurement function.

Teachers should pause to consider very carefully just what it is that modern instruments measure and how limited is the field which they cover. The philosophy which teaches that all things which exist, exist in some quantity and are, therefore, capable of being measured is theoretically true. In its practical application, however, we find ourselves confronted with the fact that while such factors may be capable of measurement, we are not to-day capable of measuring them. In other words, the instruments of measurement which we have developed measure only the things which, from one point of view, are of least importance. Educational tests

retain many of the characteristics of the traditional examination, with its tendency to supervise and govern the teaching process.

This leads to the consideration of just what types of educational tests are to-day available, and what is it that they measure? A survey of the field of standardized tests indicates that they are such elements as speed of silent reading, achievement in first-year algebra, mathematical judgment, ability to handle the fundamental operations of fractions, reasoning ability, ability to solve typical problems in arithmetic, ability in the four fundamentals of arithmetic, including fractions, knowledge of the common elements of English composition, ability of pupils in four types of written composition, ability in letter writing, general merit of composition, ability in mechanical drawing, ability to appreciate art, geographical information, comprehension of geography, ability in formal grammar, quality in handwriting, information in United States History, judgment in home economics, ability to detect common language errors, achievement in music, ability to spell commonly used words.¹¹

It should not be difficult to realize that, for the most part, such tests measure achievement in the mastery of subject matter. It cannot be too emphatically stated that mastery of subject matter is of extreme and essential importance. It is excellent to have a series of tests available for this purpose. It should never be forgotten, however, that such tests measure mastery of subject matter *irrespective of the way in which that mastery was acquired*.

¹¹ Tests of another character to measure various aspects of personality are being widely experimented with, but have not yet come into common use.

The measurement of incidental learnings. The same thing might be differently expressed by saying that such tests as we have to-day measure, for the most part, the primary subject-matter learnings, but neglect to measure what may be even more important, the incidental learnings. It is frequently the incidental learnings, however, which count the most in life. Business men interviewed and asked their opinions as to why boys and girls fail in business were asked if they ever dismissed a boy because he was poor in arithmetic, spelling, or writing. They all answered, with a smile, to the general effect that "if the boy is on the job and pleasant, and not afraid to work, we are willing to take care of the other things."

What, according to the same business men, were the incidental learnings which the boys lacked? What were the things which they failed to learn while they were acquiring mastery over subject matter? An answer may be found in surveying the following criticisms of the school product.

They lack responsibility.

When they finish a job they expect some one to give them another, rather than being alert and finding one for themselves.

They want to be told what to do and when to do it.

It seems necessary for some one to stand over them continually so that they will not waste time.

They do not coöperate. If some one criticizes them, they are disagreeable for the rest of the day.

They object to taking orders and argue with people who are directing their work

They are not punctual. They walk in five or ten minutes late and begin to watch the clock at 4:30.

They have no feeling of loyalty towards their employers.

An interesting experiment in character training has been conducted by Miss Agnes Boysen and her staff,

in the Lyndale School, at Minneapolis. The old custom of sending home report cards on the subject matter of the school was dropped. The teachers listed desirable character traits as follows: reliability, obedience, industry, self-control, social attitudes, judgment, punctuality, initiative, personal habits, thrift. These traits were then interpreted in terms which the children could understand and each child as far down as the second grade made a character booklet in which he made entries during the term under the various heads. At the end of the term the teachers took two half days and held character conferences with the children after which the children were graded and the marks on the various traits sent home on report cards. The results were most satisfactory and encouraging. It makes a child think and it makes his parents think, when he receives a grade of *F* in reliability. There is a wide field for the development of measurement of incidental learnings.

Measuring the total results of teaching. The present inability to measure anything but the simpler products of teaching, our failure to measure the most important accompaniments of school work, incidental learnings, makes it at present impossible to measure accurately the total results of teaching. This is no criticism of the testing movement. It is yet in its infancy. The statement is merely intended to emphasize the fact that while tests measure specific attainment, they do not measure efficiency, either of the teacher or of the method which she uses. It is sometimes thought that a series of elaborate calculations involving testing in the fundamental subjects and the relating of the test results to individual intelligence scores may be used to represent school efficiency. The fallacy lies in the fact that instead of representing the efficiency of the school its

teachers or its methods, such tests, and groups of tests, measure the achievement of those schools *in the factors measured* and not in any complete or general sense. In the school where the ideal is the development of a high degree of proficiency in the fundamental operations the standing according to such tests may be high. In another school which is organized to develop self-determining individuals, efficient and capable units of the social life of the community, the showing on the same group of tests may be lower. One is not warranted, however, because of this, to condemn the latter school. Such a school is only to be censured if it indicates undue and injurious neglect of proficiency in the formal subject matter.

This very organization of tests in terms of subject matter is an indication that tests are not primarily related to *teaching* or to *method of teaching* but to *administration of classrooms and schools*. When the teacher begins to think in terms of the logical order of subject matter she is thinking in logical terms for her own convenience and in the interests of school administration. Thus in considering the main function of tests it may be observed that they are administrative in nature. The specific uses of measurement are well set forth by Haggerty as:¹²

1. Changes in the classification of pupils
2. Changes in school organization
3. Changes in course of study
4. Changes in method of instruction
5. Changes in time devoted to subject
6. Changes in method of supervision

¹² *Seventeenth Yearbook of the National Society for the Study of Education* (Public School Publishing Co., 1918), p. 25.

Educational tests are also of enormous value to the teacher in helping to diagnose individual cases in her classroom. They assist in determining just where effort should be expended, they are of value in organizing and grading students. It is not wise, however, to consider that any series of tests or any testing program may be made the basis for judging the results of teaching which are being obtained by any individual teacher or by any given school.

A simple basis for estimating results. Any act is desirably educative in the degree in which it partakes of the nature of right activity which leads on to further right activity. This is the only simple criterion which can have general validity in the estimate of the results of teaching. As we look forth into the schoolroom and observe the children at work we may ask ourselves this question. Is this child in an activity which is natural and right for a child of his age? Will it lead on into other valuable activity? Thus should we see a child cramped up in an unhealthy posture striving to memorize a list of the "Kings of Israel" we might make a reasonable guess that the results of such training would be of little value. On the other hand, should we see a child absorbed in reading a copy of *Popular Mechanics* we might, in our imagination, see the youth pursuing physics in college and the man buried in some future issues of the *Scientific American*. If it is desirable to obtain a forecast of the results of teaching that forecast is best obtained by applying this test to the educative process.

After all, it is hardly possibly to make any but a feeble attempt to predict or to measure the results of teaching. The results are beyond measure in both diversity and time. The true test of the schools is the life of the community in which they are found, the life

of the community in all its institutions and in all its aspects. Better living in the schools means better living in the community. People live in the way in which they are trained to live. If the schools of the United States are to-day giving a better education than they gave fifty years ago and if they are giving it to a greater proportion of the people, then the community life of the next generation will be the witness of the results. The schoolroom of to-day is our little world of to-morrow.

PROBLEMS FOR CLASSROOM DISCUSSION

1. To what extent were the grades in mathematics which you received in high school sound judgments of your work?
2. When the performances of children in the tasks indicated on the Stanford Revision of the Binet-Simon Intelligence Scale are judged by the examiner as successes or failures, are the examiners judging subject-matter achievement? Are they judging success or failure in carrying out units of conduct? Are they judging success or failure in primary learnings? Incidental learnings?
3. What would you know about a child who failed to answer correctly questions 6, 7, and 8 on the diagnostic test given in this chapter?
4. Discuss the practicability of using standard achievement tests in the classroom in terms of the time required for administering and scoring them.
5. Take each of the criticisms given by business men and quoted in this chapter separately. Discuss to what extent the failure of individuals concerned was due to inability to carry out a unit of conduct wisely and well.

OUT-OF-CLASS ACTIVITIES

1. Obtain a copy of a bibliography of educational tests.
2. Obtain copies of some tests and give them to a class. Record the scores on squared paper and plot the graph. Compute the median score.
3. Construct a simple scale to measure some incidental learning.

4. Obtain a copy of the scoring form from the publishers (Houghton Mifflin Co.), and with the aid of the directions in Dr. Terman's book give the test to some child.

5. Make a new-type test in some subject and give it to a class. Score it. Estimate what it has measured.

6. Witness some classroom activity and estimate it as one which is suitable for the present and which leads on to good future activity.

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APPENDIX

A TEACHER'S SELF-RATING SCALE

One of the disadvantages of many courses in education is that teachers who study are seldom able to do much teaching at the same time. They are not able to put the ideas which they gain into practice at the time of learning. Consequently a great deal is forgotten. The following scale has been based on this book, in order to be, if possible, of some assistance in the difficulty. It may assist teachers in the field at some future time, to recall the learnings which they have gained by studying the present pages. It may be of further value to the teacher in rating her own teaching, term by term, with respect to certain important elements.

The scale is arranged in such a way that there are several columns in which the teacher may rate herself in each factor listed. It is thus possible to rate oneself in the first column at the conclusion of a half year's teaching and to use the further columns at the end of succeeding terms, thus making possible a comparison of one's work with other terms. It is suggested when rating in later terms that the ratings of earlier terms be covered with a strip of paper so that they may not influence judgment. Each element may be rated from 1 to 5, 1 being the lowest score and 5 the highest.

TEACHER'S SELF-RATING SCALE

Rate each element from 1 to 5

	1	2	3	4	5	6	7	8
1. Am I actively engaged in preparing a good environment, an environment rich in stimuli?								
2. A natural environment?								
3. A social environment?								
4. Am I careful about selecting the right responses and rejecting the wrong ones?								
5. Am I using the law of associative shifting to develop the series of responses I receive into the series of responses which I want?								
6. Is the learner dominating the learning process or am I unduly active in what should be his learning process?								
7. Do the learners carry on the activities in which they are engaged for their own sake, that is, is the motivation direct rather than artificial?.....								
8. Does the organization of the work provide for individual differences?								
9. Are the conduct units which I use sufficiently like life in their mold? [Are they as like life as it is practicable under present circumstances to make them?]								
10. Am I organizing my subject matter into conduct units which are clearly initiated, due to a felt need?								
11. Dominated by a real purpose?..								
TOTAL..								

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